# COURSEWARE

# DORSETT

**Educational Systems, Inc.**

P.O. Box 1226, Norman, Ok. 73070

Mg

DORSETT EDUCATIONAL SYSTEMS, INC.
Answer Key

Correct Answer Shown

Align Bottom and Left Edge

1. Which of these is a right tri-
   angle?



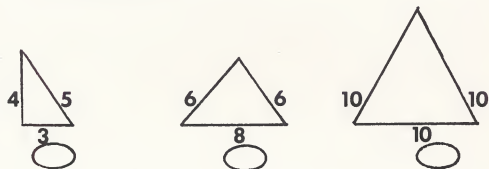  ○          ○          ○

2. The hypotenuse of a right tri-
   angle is the _____ side.
    shortest    longest    either
      ○          ○          ○

3. The hypotenuse is the side
   opposite the _____ angle.
    straight   smallest   right
      ○          ○          ○

4. An equilateral triangle has
   _____ equal sides.
      one      two    three
      ○        ○     ○

5. Which of these is an isosceles
   triangle?



  ○          ○          ○

6. Which triangle has no equal
   sides?
   isosceles  equilateral   scalene
     ○          ○         ○

7. How many degrees is a right
   angle?
   ○ $180^{o}$    ○ $90^{o}$    ○ $45^{o}$

1.  What is the perimeter of a tri-
    angle?
        space           distance
       inside it        around it
          ○                ○
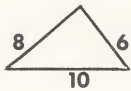
2.  Which formula gives the peri-
    meter of a triangle?
        Sa−Sb−Sc ○      Sa+Sb+Sc ○

3.  What is the perimeter of this
    triangle?



    ○ 23        ○ 24        ○ 14

4.  How many ways are there to
    find the perimeter of an equi-
    lateral triangle?
        two             one
         ○               ○

5.  What does this formula find?
            3 x side
        perimeter of    perimeter of
        any triangle    equilateral tri-
                             angle

         ○               ○

6.  Which of these line segments
    can be used to make a triangle?
    3, 4, 8        1, 2, 3        4, 6, 8
      ○              ○              ○

1. What are we trying to find in
   this formula?
        Sc = Perimeter - Sa - Sb
   ◯ Sa        ◯ Sb        ◯ Sc

2. To find Side C below, do we add
   or subtract 4 inches and 3 inches
   from the perimeter?
   4 inches + 3 inches + Side C =
   Perimeter
        ◯ subtract        ◯ add

3. What is the first step to follow
   when you use the formula to
   solve a problem?
        ◯ substitute numbers
        ◯ write formula
        ◯ solve formula

4. What is the second step?
        ◯ solve formula
        ◯ write formula
        ◯ substitute numbers

5. What is the third step?
        ◯ solve formula
        ◯ write formula
        ◯ substitute numbers

1. To find the length of each side
   of an equilateral triangle, what
   do you put on the opposite side
   of the equal sign?
   
   3 x Side = Perimeter

   Side          Perimeter          3
   ◯               ◯               ◯

2. If you multiply by 3 on one side
   of the equal sign, you _____ by
   3 on the opposite side.
   
   multiply ◯        divide ◯

3. What is the length of each side
   of an equilateral triangle whose
   perimeter is 12 inches?

   3 inches   6 inches   4 inches
   ◯           ◯          ◯

4. What is the length of each side
   of an equilateral triangle whose
   perimeter is 120 yards?
   
   30 yards  60 yards    40 yards
   ◯           ◯          ◯

5. What is the length of each side
   of an equilateral triangle whose
   perimeter is 3 feet?
   
   3 feet        9 feet       1 foot
   ◯              ◯            ◯

1. Area is measured in _____ units.
   - ○ square
   - ○ cubic

2. The side a triangle sits on is called the _____.
   - ○ base
   - ○ hypotenuse
   - ○ height

3. The height of a triangle is the straight - line distance from the _____ to the _____.
   - ○ base,hypotenuse
   - ○ side,base
   - ○ top angle,base

4. What is the area of this triangle?

   

   - ○ 12
   - ○ 20
   - ○ 24

5. Which is the height of this triangle?
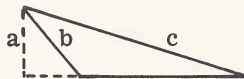
   

   - ○ a
   - ○ b
   - ○ c

D155

1.  What is the square of 4?

    ○ 4+4          ○ 4-4          ○ 4x4

2.  Do all these mean the same?

    8x8    $8^2$    8 squared    64

           ○ Yes          ○ No

3.  4 is the _____ of 16.

           ○ square          ○ square
                                root

4.  What is this symbol?    $\sqrt{\phantom{xx}}$

         ○ square          ○ square
           root

5.  Choose the correct answer for each of
    these:

    $5^2$      ○ 25          ○ 36          ○ 10

    $\sqrt{144}$  ○ 20,736      ○ 12   ○ 72

    $9^2$      ○ 18   ○ 81          ○ 3

    $\sqrt{169}$  ○ 13          ○ 28,561   ○ 84

    $3^2$      ○ $1\frac{1}{2}$   ○ 6          ○ 9

    $\sqrt{16}$   ○ 256  ○ 4          ○ 8

D66

1. Which rectangle contains a diagonal?
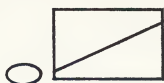
○   ○   ○ both

2. Rectangle contain 4 ____ angles.

○ 45°      ○ 90°      ○ 180°

3. Does a diagonal divide a rectangle into 2 equal right triangles?

○ Yes      ○ No

4. Which line is the hypotenuse?
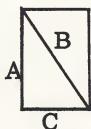
○ Line A      ○ Line B      ○ Line C

5. What is the length of Side X?

○ 8      ○ 6      ○ 5

6. What is the length of Side M?
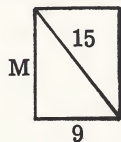
12
○

11
○

14
○

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1. What is the square of 4?

○ 4+4　　　○ 4-4　　　○ 4x4

2. Do all these mean the same?

8x8　　$8^2$　　8 squared　　64

○ Yes　　　○ No

3. 4 is the _____ of 16.

○ square　　　○ square root

4. What is this symbol?　$\sqrt{\phantom{x}}$

○ square root　　　○ square

5. Choose the correct answer for each of these:

$5^2$　　○ 25　　　○ 36　　　○ 10

$\sqrt{144}$　○ 20,736　　○ 12　　○ 72

$9^2$　　○ 18　○ 81　　　○ 3

$\sqrt{169}$　○ 13　　　○ 28,561　○ 84

$3^2$　　○ $1\frac{1}{2}$　○ 6　　　○ 9

$\sqrt{16}$　○ 256　○ 4　　　○ 8

1.  The Pythagorean Theorem can be used only on right triangles.

    ○ Yes          ○ No

2.  The Pythagorean Theorem states that if you know ____ of a right triangle, you can always find the other ____.

    ○ one side      ○ two sides
        two              one

3.  What is the length of the hypotenuse of this triangle?

    b=4 ◁ c=?
        a=3
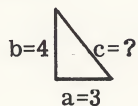
    ○ 6          ○ 5          ○ 7

4.  What is the length of side a of this triangle?

    b=12 ◁ c=13
         a=?
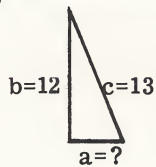
    ○ 11         ○ 8          ○ 5

5.  To find the hypotenuse, what do you do?

    ○ add $a^2 + b^2$
    ○ subtract $c^2 - a^2$

6.  To find side a, what do you do?
    ○ add $b^2 + c^2$
    ○ subtract $c^2 - b^2$

D 57

1.  What type of triangle is this?

    5-12-13          3-4-5
       ○                ○

2.  Which kind is this?

    5-12-13          3-4-5
       ○                ○

3.  Which triangle is labeled correctly?

    3 ⟍ 5        4 ⟍ 5        5 ⟍ 4
      4            3            3
      ○            ○            ○
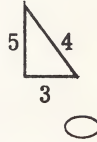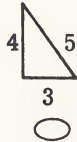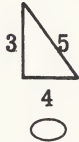
4.  Which is labeled correctly here?

    ○  13 ⟍ 12        ○  12 ⟍ 13
          5                 5

5.  What is the length of side b?

        b=? ⟍ c=10
           a=6
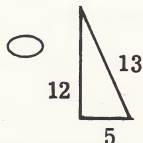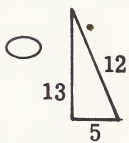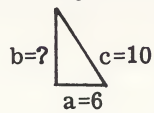
    ○ 8          ○ 4          ○ 6

6.  What is the length of side x?

        y=24 ⟍ z=26
           x=?
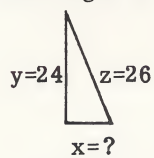
    ○ 5          ○ 20         ○ 10

7.  What is the length of side a?

        b=12 ⟍ c=13
           a=?
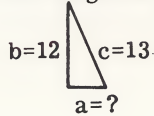
    ○ 6          ○ 5          ○ 10

D160

1. Must the sides of a right triangle be whole numbers?

   ◯ YES          ◯ NO

2. What do you use to find side a?
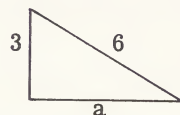
   

   ◯ Pythagorean Theorem
   ◯ 3-4-5 Triangle Rule

3. Is the square root of 85 a whole number?

   ◯ YES          ◯ NO

4. The square root of 44 is between ____.

   ◯ 3-4          ◯ 6-7          ◯ 9-10

5. What is the length of side b?

   

   ◯ 8          ◯ 4          ◯ 5

D-58
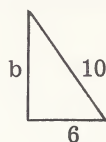
1. The length of a rectangle is the
   _____ side.

   ○ longest          ○ shortest

2. The width of a rectangle is the
   _____ side.

   ○ longest          ○ shortest

3. What is the perimeter of this rectangle?
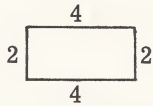
   

   ○ 6          ○ 12          ○ 8

4. Which formula is used to find the
   perimeter of a rectangle?

   ○ 2L +2W
   ○ L x W

5. In which formula have the numbers for
   length and width been substituted
   correctly.

   ○ 2 x L + 2 x W          ○ 2 x L + 2 X W
     2 x 4 + 2 x 2            2 x 2 + 2 x 4

6. Which formula can be used to find
   the perimeter of a square?

   ○ S + S + S + S   ○ 4 x s          ○ either

7. What is the perimeter of this square?

   

   ○ 4          ○ 8          ○ 6

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D 59

1. Which is the correct way to move 2W to the opposite side?

○   Perimeter = 2L + 2W
○ Perimeter - 2W = 2L
○ Perimeter + 2W = 2L

2. What is the length of this rectangle?
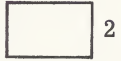
☐  2        Perimeter = 10

○ 4      ○ 6        ○ 3

3. What is the width?

☐      Perimeter = 78
20

○ 49      ○ 19      ○ 29

4. What is the length of each side of a square whose perimeter is 40 miles?

○ 10 inches     ○ 10 miles     ○ 10

5. If a number is added on one side of an equation, to move it _____ the values on the opposite side.

○ add it to     ○   subtract it from

6. Perimeter of a Square = ?

○ 4 x side     ○ 2 x side     ○ 3 x side

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D60

1.  If the area of part A is 10 square inches,
    what is the area of part B?
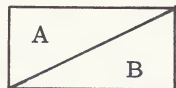


    ○ 5 square        ○ 10 square       ○ don't
       inches            inches            know

2.  If the area of triangle X is 7 square
    feet, what is the area of the rectangle?
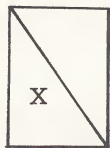


    ○ 14 square       ○ 21 square       ○ don't
       feet              feet              know

3.  Find the area.
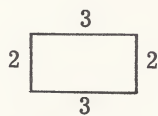


    ○ 13              ○ 10              ○ 6

4.  What is the area?
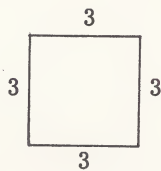


    ○ 9               ○ 6               ○ 12

5.  Area is always in _____ units.
    ○   cubic              ○   square

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D-67

1. Does every circle have 2 centers?

   ◯ Yes          ◯ No

2. Is it possible to draw a circle with Radius X=3 inches and Radius Y= $3\frac{1}{4}$ inches long?

   ◯ Yes          ◯ No

3. Is it possible to draw a circle with a radius of 3 feet and a diameter of 6 feet?

   ◯ Yes          ◯ No

4. If the diameter of a circle is 12, what is the radius?

   24◯          6 ◯          4◯

5. How many radii is 4 diameters equal to?

   ◯16          ◯8          ◯2

D-71

1. Which of these is a measure of volume?

12 ◯     3 square ◯     20 cubic ◯
         inches            feet

2. What is the volume of a box whose length is 6 inches, height is 10 inches, and width is 4 inches?

64 cubic ◯     240 cubic ◯     20 cubic ◯
  inches          inches          inches

3. What is the volume of a cube whose sides are 3 feet?

9 cubic ◯     27 cubic ◯     12 cubic ◯
  feet          feet           feet

4. Which of these could be used to find volume?

◯ 3.14 x $16^2$ x 10    ◯ 2 x 3.14 x 5

5. Which has volume?
◯ triangle     ◯ circle     ◯ cube

6. How many sides does a cube have?
◯ 4     ◯ 6     ◯ 8

7. $\pi$ x $r^2$ x h = volume of a _____ .
◯ can     ◯ circle     ◯ box

# MATHEMATICS Mg
## Geometry series

1. Which of these shapes is a triangle?
(A) (B) (C)

2. A triangle is a closed shape. How many sides and how many angles does it have? (4, 4) (3, 3) (3, 2)

3. The first triangle we will study is the right triangle. It always has one right angle. Does the word 'right' in the name right triangle stand for the 90-degree angle? (yes) (no)
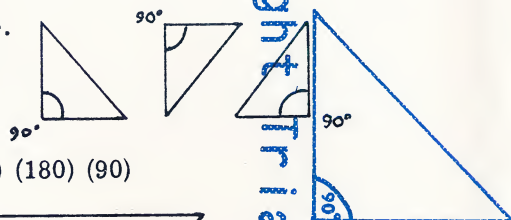
4. How many degrees does a right angle contain? (45) (180) (90)

5. Which of these is a right triangle? (A) (B) (both)
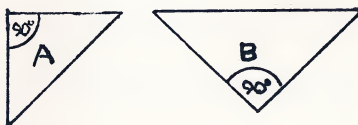
6. In a right triangle the side opposite the right angle has a special name. It is called the hypotenuse. How many hypotenuses does a right triangle have? (1) (2) (3)
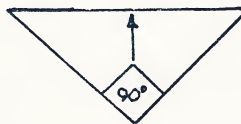
7. This right triangle has the lengths of its sides marked. How does the hypotenuse compare with the other two sides? (longest side) (shortest side) (equal to another side)

4  5  3
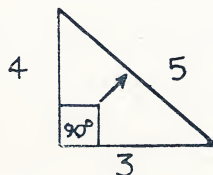
8. What is the length of the hypotenuse of this triangle? (10 ft.) (8 ft.) (6 ft.)



6 FT   10 FT
90°
8 FT
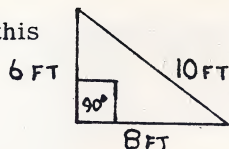
9. Is the hypotenuse the shortest, or the longest side of a right triangle? (shortest) (longest)

10. Which side is opposite the right angle in a right triangle? (length) (hypotenuse) (height)

11. Which is correct for right triangles? (hypotenuse is opposite the right angle) (hypotenuse is the longest side) (both)

12. These are equilateral triangles. How many equal sides do equilateral triangles have? (2) (3) (none)
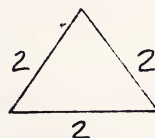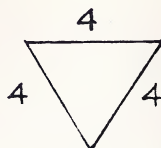


13. The 'equi' in equilateral stands for equal, and the 'lateral' stands for sides. So equilateral means equal-sides. Which means equal? (lateral) (equi)

14. Which means sides? (lateral) (equi)

15. Which of these is an equilateral triangle? (A) (B) (C)
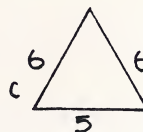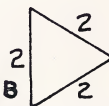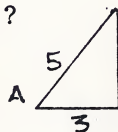


16. Find the equilateral triangle here. (A) (B) (C)
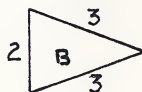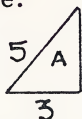


17. Which triangle has three equal sides? (right triangle) (equilateral triangle)

18. Complete this sentence. "A right triangle has _____." (3 equal sides) (1 right angle)

19. What is the longest side in a right triangle? (hypotenuse) (base) (right angle)

20. Do equilateral triangles have a hypotenuse? (yes) (no)

21. Here are two isosceles triangles. How many equal sides do they have? (3) (2) (none)

2
3
2
5 5
4
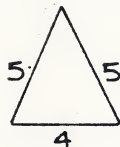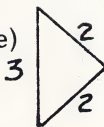
22. Which of these is an isosceles triangle?
(A) (B) (C)

2 A 2
2
4 B 5
3
4 C
6
6
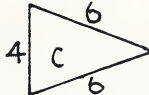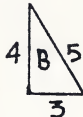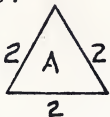
23. Which of these is an isosceles triangle?
(A) (B) (both)

4 A 4
4
3 B 3
2
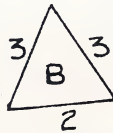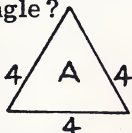
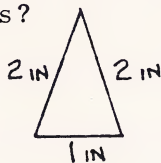24. How many equal sides do isosceles triangles have? (none) (2) (3)

25. Match this triangle with its name.
(isosceles) (right) (equilateral)

90°

26. What is the name of this triangle?
(isosceles) (right) (equilateral)

1 IN   1 IN
1 IN

27. What kind of triangle is this?
(isosceles) (right) (equilateral)

2 IN   2 IN
1 IN

28. Match this triangle's name with its definition: isosceles triangle. (3 equal sides) (2 equal sides) (contains 90 degrees)

29. An equilateral triangle has which of these? (3 equal sides) (2 equal sides)

30. Another kind of triangle is the scalene triangle. Here are two examples. How many equal sides do they have? (3) (2) (none)

5
3
4
4
3
2
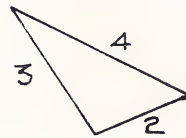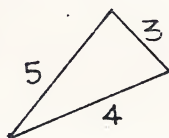
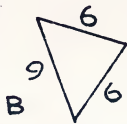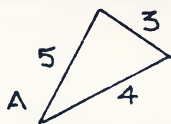31. Are all these scalene triangles? (yes) (no)
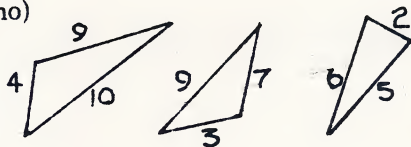
32. Pick out the scalene triangle.
(A) (B) (C)
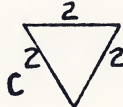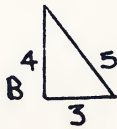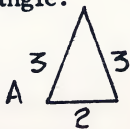
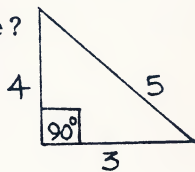33. Which is a scalene triangle?
(A) (B) (both)

34. Which triangle has no equal sides?    (equilateral) (scalene) (isosceles)

35. Which triangle has one right angle?  (isosceles) (equilateral) (right)

36. What name best describes this kind of triangle?
(scalene) (right)

1. If you wanted to put a fence around a garden, you would need to know the distance around it to know how much fence to buy.  The distance around it is called the perimeter.

2. To find the perimeter of a triangle, add all the sides together.  Five feet plus four feet plus three feet equals twelve feet perimeter.  What is the perimeter of the bottom triangle?
(10) (12) (15)

5 FT   4 FT
3 FT

5 IN   5 IN
5 IN

**Right Triangle**
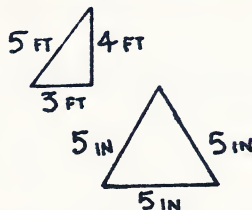
3. Is the perimeter of a triangle the distance around it or the space inside? (distance around)
(space inside)

90°

4. What is the perimeter of this triangle?
(10 miles) (8 miles) (14 miles)

4 MILES   4 MILES
6 MILES

5. Find the perimeter of this triangle.
(15 miles) (11 miles) (14 miles)

6 MILES   5 MILES
3 MILES

6. Fill in the blank to complete this sentence.  "To find the perimeter of a triangle, _____ all the sides together."  (multiply) (add) (subtract)

7. What is the perimeter of a triangle whose sides are three feet, ten feet, and eight feet?
(21 feet) (30 feet)

8. If we label the sides of a triangle, we can use a formula to find the perimeter.  Side 'a'
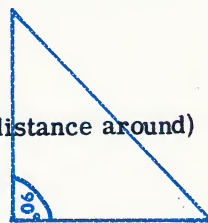
plus side 'b' plus side 'c' equals perimeter.
We can shorten this formula to: S sub 'a' plus
S sub 'b' plus S sub 'c'; S stands for side.
Can we find the perimeter of a triangle by adding
the sides together, using the formula, or both
ways? (adding sides together) (using formula)
(both)



9. Follow these steps to find the perimeter.
Step one: write the formula: S sub 'a' plus
S sub 'b' plus S sub 'c' equals perimeter.
Step two: substitute the numbers you know
into the right places in the formula. Four
inches plus five inches plus three inches
equals perimeter. Step three: solve the
formula. Which answer is correct? (12 inches)
(10 inches)
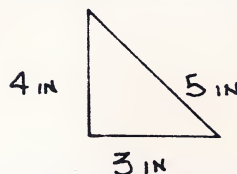


10. Follow the steps to find the perimeter of this triangle.
(29 inches) (27 inches) (19 inches)
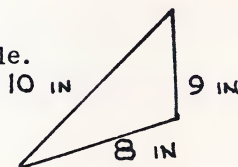


11. How many steps do you follow when you use a formula? (3) (2) (1)

12. What is the first step when you use the formula? (solve formula) (write formula)

13. What is the second step? (solve formula) (substitute numbers)

14. What is the third step? (solve formula) (substitute numbers) (write formula)

15. The three sides of a triangle are five inches, five inches, and three inches. To find
the distance around it, do you solve for the perimeter or a side of the triangle? (perimeter)
(side)

16. Which of these formulas do you write to solve
the problem? (1) (2) (3)

(1) $S_a + S_b$ = Perimeter
(2) $S_a + S_b + S_c$ = Perimeter
(3) $S_a + S_c$ = Perimeter

17. Which of these is the correct substitution of numbers into the formula? (1) (2)

(1) 3 in. + 5 in. + 5 in. = Perimeter
(2) 3 in. + Perimeter = 15 inches

18. What is the perimeter of a triangle? ($S_a + S_b + S_c$) (distance around) (both)

19. Which of these shows the correct substitution of numbers into the formula for this triangle? (1) (2)

    (1) 75 miles = Perimeter
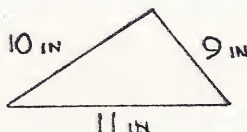    (2) 50 mi. + 25 mi. + 50 mi. = Perimeter

50 MILES

25 MILES    40 MILES

20. What is the perimeter of this triangle? (75 miles) (115 miles) (100 miles)

50 MILES

25 MILES    40 MILES

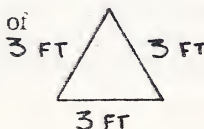21. Which of these is the correct formula to find the perimeter of this triangle? (1) (2)

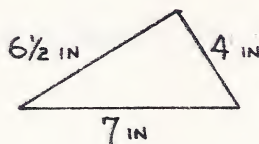    (1) $S_a + S_b$ = Perimeter - $S_c$
    (2) $S_a - S_b + S_c$ = Perimeter

10 IN    9 IN

11 IN

22. Substitute into the formula for the triangle above and finish the problem. (30 in.) (29 in.)

23. Use the three steps to find the perimeter of this triangle. (6 ft.) (9 ft.) (12 ft.)

3 FT    3 FT

3 FT

24. What is the perimeter of this triangle? (10 1/2 in.) (17 in.) (17 1/2 in.)

6½ IN    4 IN

7 IN

25. There are two ways to find the perimeter of an equilateral triangle. The first way is to add all the sides together. Another way is to multiply one side by three, since all the sides are the same length. Two feet times three equals six feet. Find the perimeter of the bottom equilateral triangle by multiplying one side by three.

2 FT    2 FT

2 FT

4 IN    4 IN

4 IN
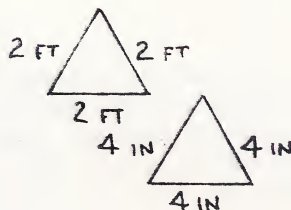
26.  It doesn't matter which way you find the perimeter of an equilateral triangle.  Check for yourself that both ways give the same perimeter, then go on.

3 FT / 3 FT / 3 FT

    1st way:
            3 ft. + 3 ft. + 3 ft. = 9 ft.  Perimeter
    2nd way:
            3 ft. x 3 = 9 ft.  Perimeter
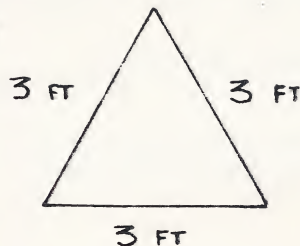
27.  What is the perimeter of this equilateral triangle? (6 miles) (8 miles) (4 miles)

2 MILES / 2 MILES / 2 MILES
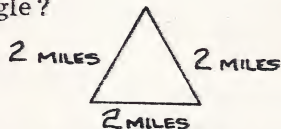
28.  To find the perimeter of an equilateral triangle, what do you do?  (add sides) (multiply one side by 3) (either)

29.  Since we can find the perimeter of an equilateral triangle by multiplying one side by three, we need to know only one side to find the perimeter.  Two inches times three equals six inches.  What is the perimeter of the bottom equilateral triangle?  (5 ft.) (10 ft.) (15 ft.)

2 IN

5 FT
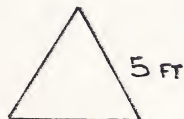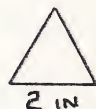
30.  To find the perimeter of an equilateral triangle, what number do you multiply a side by? (1) (3) (2)

31.  What is the perimeter of this equilateral triangle? (2 ft.) (6 ft.) (4 ft.)

2 FT
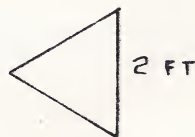
32.  Find the perimeter of this triangle. (17 ft.) (30 ft.) (23 ft.)

10 FT

7 FT / 6 FT
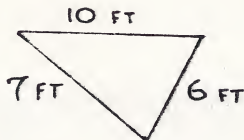
33.  The shortest distance between any two points is a straight line.  In this triangle, between the points A and B, it is the straight line AB, which is 10. To form a triangle the sum of the other two sides must be longer than AB.  Side AC plus side CB is four plus seven.  Is this sum greater than AB? (yes) (no)

C

4 / 7

A  shortest distance  B
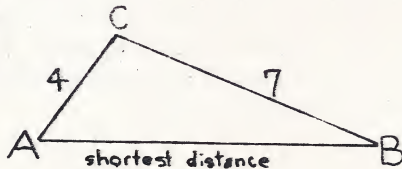
**34.** What is the shortest distance between **X** and **Y** in this triangle? (10) (4) (12)
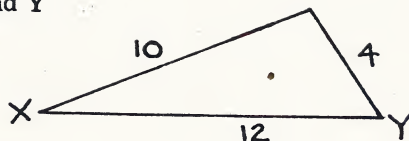
**35.** Add the lengths of sides **MN** and **NO** together. Are they longer than side **MO**? (yes) (no)
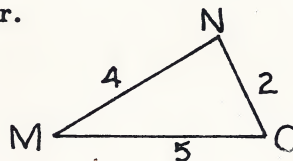
**36.** The sum of the two short sides of a triangle must be greater than the longest side. Otherwise the triangle would look like this. Is it possible to make a triangle with line segments of 2, 3, and 7 inches? (yes) (no)
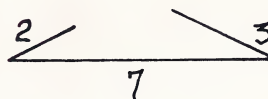
**37.** Which of these line segments can be used to make a triangle? (6, 10, 8) (4, 12, 7)

**38.** Which of these line segments cannot be used to construct a triangle? (6, 3, 8) (4, 7, 1) (3, 4, 5)

# MATHEMATICS Mg₃
## Geometry   series

1. What is the perimeter of a triangle?  (distance around) (longest side) (hypotenuse)

2. To find the perimeter of a triangle, do you multiply, subtract, or add the sides together?
(multiply) (subtract) (add)

3. We can use this formula to find the perimeter:
side 'a' plus side 'b' plus side 'c'.  What is the
perimeter of this triangle?  (21 in.) (27 in.) (17 in.)

10 IN    10 IN
7 IN

Right Triangle

4. In an equilateral triangle the three sides are equal.  To find the perimeter, can you
multiply one side by three, add all the sides together, or either?  (multiply one side by 3)
(add sides together) (either)

5. What is the perimeter of this equilateral triangle?
(15 miles) (10 miles) (5 miles)

5 MILES
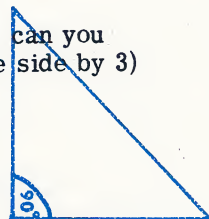
6. If we know the lengths of two sides and the perimeter, we can use the formula to find
the third side.  We leave the unknown side on one side of the equal sign and move
everything else to the other.  In this formula, what are we trying to find?  (side 'a')
(side 'b' and side 'c')  (perimeter)

Side a + Side b + Side c = Perimeter

Side a = Perimeter - Side b - Side c

7. To find side 'a', leave it by itself on one side of the equal sign, and put side 'b' and
side 'c' on the opposite side.  Side 'a' equals perimeter minus side 'b' minus side 'c'.
In the bottom formula what are we trying to find?  (side 'a' and side 'c') (side 'b')

Side a = Perimeter -  Side b - Side c

Side b = Perimeter -  Side a - Side c

8. We moved side 'a' and side 'c' to the opposite side. When we want to find side 'a', what do we have to move? (side 'a') (side 'b' and side 'c') (side 'c')

<div align="center">Side a + Side b + Side c = Perimeter</div>

9. If we want to find side 'c', what do we have to move? (side 'a' and side 'b') (side 'c' and side 'b') (perimeter and side 'c')

<div align="center">Side a + Side b + Side c = Perimeter</div>

10. There is a rule to follow. If a number is added on one side of the equal sign, to move it you must subtract it from the values on the opposite side. So when we move side 'a' plus side 'b' to the opposite side, do we add or subtract? (add) (subtract)

11. Which formula will we have? (1) (2)

(1) $S_c$ = Perimeter - $S_a$ - $S_b$
(2) $S_c$ = Perimeter + $S_a$ + $S_b$

12. To leave side 'b' by itself, do we add or subtract side 'a' and side 'c' from the perimeter? (add) (subtract)

Side a + Side b + Side c = Perimeter

13. To find side 'c', do we add or subtract four inches and seven inches from the perimeter? (add) (subtract) 4 in. + 7 in. + Side c = Perimeter

14. To solve this formula, do we add or subtract? (add) (subtract)

3 ft. + Side b + 4 ft. = 12 ft.

15. If a triangle has side 'a' equal to four inches, side 'b' equal to three inches, and a perimeter of twelve inches, what do you need to find? $(S_c)$ $(S_a)$

16. Which formula will you use for this problem? (area) (perimeter)



$S_a = 4$ IN   $S_b = 3$ IN   $S_c = ?$
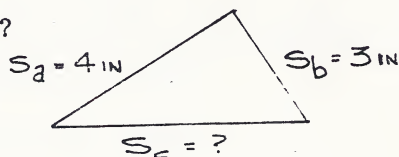
17.  What do we put by itself on one side
of the equal sign in order to work the
problem?  ($S_b$) ($S_c$) ($S_a$)

$S_a = 4$ IN    $S_b = 3$ IN    $S_c = ?$

18.  To move something added on one side of the equal sign, must it be added or subtracted
on the opposite side?  (added) (subtracted)

19.  When you leave side 'c' by itself on one side of the equal sign, which formula is correct?
(1) (2)

$$S_a + S_b + S_c = \text{Perimeter}$$

(1) $S_c = \text{Perimeter} + S_b + S_a$     (2) $S_c = \text{Perimeter} - S_b - S_a$

20.  To find side 'a' of this triangle: first write
the formula; then substitute the numbers you
know into the right places.  Next, put side 'a'
by itself on one side of the equal sign.  Which
of these is correct?  ($S_a = 15$ in. $-$ 4 in. $-$ 3 in.)
($S_a = 15$ in. $+$ 4 in. $+$ 3 in.)

$S_b = 4$ IN    $S_c = 3$ IN    $S_a = ?$
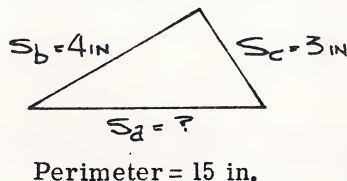
Perimeter = 15 in.

21.  Now subtract sides 'b' and 'c' from the
perimeter.  What is the length of side 'a'?
(22 inches) (8 inches)

(See illustration for frame 20.)

22.  To find side 'b' of this triangle, first write
the formula; then substitute the numbers you
know into the right places.  Which of these
shows the correct substitution?  (1) (2)

$S_a = 3$ IN    $S_b = ?$    $S_c = 5$ IN

(1) 3 in. $+ S_b +$ 5 in. $=$ 13 in.
(2) 3 in. $- S_b -$ 5 in. $=$ 13 in.
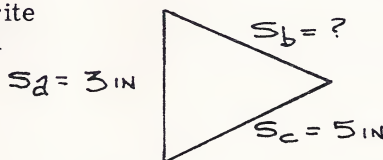
23.  Now put side 'b' by itself on one side of
the equal sign, and solve the formula.  What
is the length of side 'b'?  (3 in.) (5 in.) (7 in.)

(See illustration for frame 22.)

24. To find the length of side 'c' in this triangle, write the formula, then substitute the numbers you know into the right places and solve the formula. What is the length of side 'c'? (3 in.) (6 in.)

$S_c = ?$   $S_b = 12$ IN

$S_a = 10$ IN
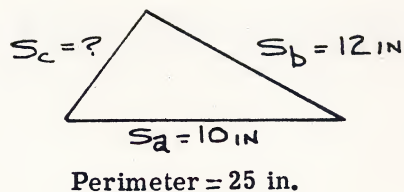
Perimeter = 25 in.

25. To find the length of side 'b' in this triangle, which formula do you write? (1) (2)

   (1) Perimeter = $S_a + S_b + S_c$
   (2) $S_a + S_b$ = Perimeter

$S_a = 4$ IN   $S_b = ?$

$S_c = 4$ IN   Perimeter = 12 in.
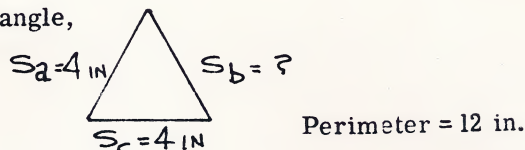
26. What is the length of side 'b'? (6 inches) (4 inches) (2 inches)

(See illustration for frame 25.)

27. Now find the length of side 'c'. (20 ft.) (10 ft.) (11 ft.)

Perimeter = 41 ft.

$S_a = 16$ FT   $S_c = ?$

$S_b = 15$ FT
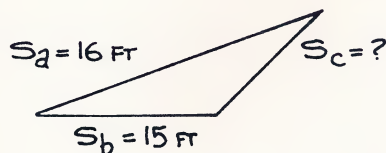
28. Find the length of side 'a' in this triangle. (11 in.) (13 in.) (7 in.)

Perimeter = 28 in.

$S_b = 11$ IN   $S_a = ?$

$S_c = 10$ IN
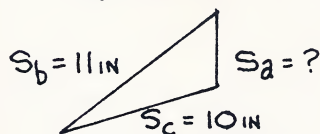
29. Find side 'a' in this triangle. (23 in.) (20 in.) (14 in.)

Perimeter = 40 in.

$S_a = ?$   $S_b = 6$ IN

$S_c = 11$ IN
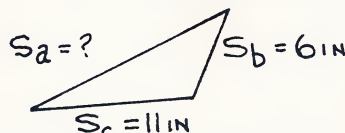
30. What is the length of side 'c' in this triangle? (2 in.) (6 in.) (4 in.)

Perimeter = 12 in.

4 IN   4 IN

$c = ?$
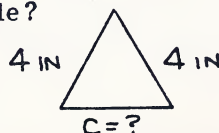
31. Which is the first step in solving a problem? (solve formula) (substitute numbers) (write formula)

32. Which is step two? (solve formula) (write formula) (substitute numbers)

33. Which is step three? (substitute numbers) (solve formula) (write formula)

1. What kind of triangle is this?  (scalene) (isosceles)
(equilateral)
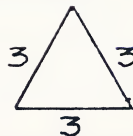
2. What does 'equi' in the word 'equilateral' mean?  (unequal) (equal) (sides)

3. What does 'lateral' mean?  (sides) (equal) (unequal)

4. So what does an equilateral triangle have?  (3 equal sides) (3 unequal sides) (2 equal sides)

5. Which formula gives the perimeter of an equilateral triangle?  (4 x side) (3 x side)
$(S_a + S_b)$

6. Find the perimeter of this equilateral triangle by
multiplying three times the length of a side.  (12 feet)
(8 feet) (7 feet)
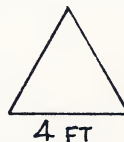
7. What is the perimeter of this equilateral triangle?
(4 feet) (8 feet) (6 feet)
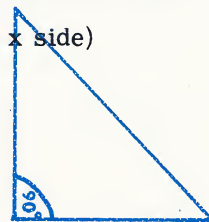
8. The perimeter of a triangle is 15 inches.  What don't you know?  (length of each side)
(distance around the triangle)

9. To find the length of each side, we can use
the formula for perimeter and leave 'side' by        3 x  [ SIDE ]  = Perimeter
itself on one side of the equal sign.  What do
you put on the opposite side?  (SIDE) (3)

10. Remember when you move something from one side of the equal sign to the other, you
perform the opposite operation.  So if you multiply by three on one side, do you multiply or
divide by three on the opposite side?  (multiply) (divide)

Right Triangle

MG

11. So to find the length of each side, write the formula: three times side equals perimeter. Then substitute the numbers you know into the formula: three times side equals 15 inches. To solve leave 'side' by itself on one side of the equal sign, and divide. What is the length of each side? (4 inches) (5 inches) (6 inches)

12. To find the length of the sides of this equilateral triangle, follow the same three steps. Write the formula: substitute the numbers; then leave 'side' by itself on one side of the equal sign, and divide. What is the length of each side? (7 inches) (3 inches) (4 inches)
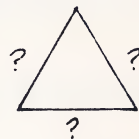
Perimeter = 21 in.

13. To find the length of the sides of this equilateral triangle, write the formula, then substitute numbers. Which substitution is correct? (18 in. x 3 = side) (side x 18 = 3) (3 x side = 18 inches)
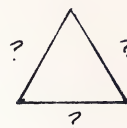
14. Which is the correct way to leave 'side' on one side of the equal sign? (1/3 Side = 18 in.) (Side = 18 in. /3)
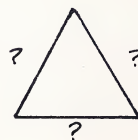
15. What is the length of each side? (6 inches) (8 inches) (12 inches)
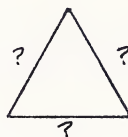
16. Now find the length of each side of this equilateral triangle. (11 inches) (9 inches) (10 inches)
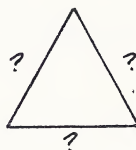
17. If the perimeter of an equilateral triangle is 90 feet, what is the length of each side? (30 feet) (20 feet) (40 feet)

18. If an equilateral triangle has a perimeter of nine yards, find the length of each side. (7 yards) (3 yards) (2 yards)

19. If the perimeter of an equilateral triangle is six feet, what are the lengths of its sides? (3 feet) (2 feet) (6 feet)

20. If an equilateral triangle has a perimeter of 30 feet, what are the lengths of its sides? (10 feet) (15 feet) (5 feet)

21. Find the length of each side of an equilateral triangle whose perimeter is 33 feet. (13 feet) (15 feet) (11 feet)

22. What does this formula find: 3 x side = ? (perimeter of equilateral triangle) (perimeter of any triangle)

23. What does this formula find: $S_a + S_b + S_c$ = ? (perimeter of equilateral triangle) (perimeter of any triangle)

24. Is this an equilateral triangle? (yes) (no)

$S_a = ?$ $S_b = 8$ IN $S_c = 9$ IN
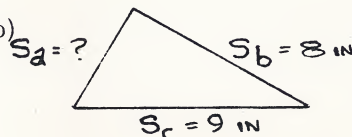
25. Which formula would you use to find 'side a'? (Perimeter = $S_a + S_b + S_c$) (Perimeter = 3 x Side)

$S_a = ?$ $S_b = 8$ IN $S_c = 9$ IN
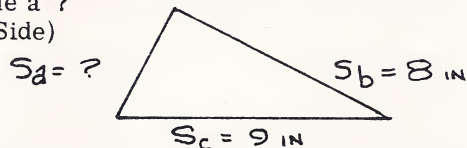
26. Which of these shows how to correctly leave 'side a' by itself on one side of the equal sign? ($S_a$ = Perimeter + $S_b$ + $S_c$) ($S_a$ = Perimeter - $S_b$ - $S_c$)

27. Now substitute into the formula and solve. (3 inches) (4 inches) (5 inches)

$S_a = ?$ $S_b = 8$ IN $S_c = 9$ IN
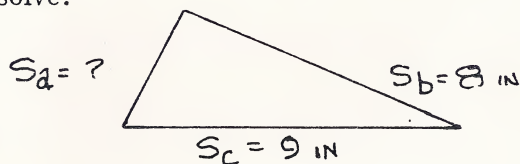
28. Find the length of 'side c' in this triangle. (9 inches) (10 inches) (11 inches)

$S_a = 11$ IN $S_c = ?$ $S_b = 11$ IN
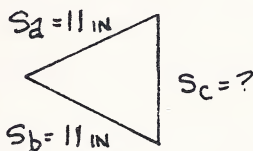
29. What is the length of each of the sides of an equilateral triangle whose perimeter is 66 inches? (22 feet) (22 inches) (11 inches)

? ? ?
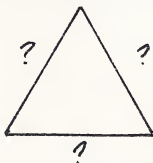
# MATHEMATICS Mg 5
## series
### Geometry

1. The space inside a shape is called the area.
Which of these shapes has its area shaded?
(A) (B) (C)



A          B          C
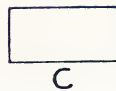
2. If you wanted to lay a brick floor, you would need to know the space inside the floor to know how many bricks to buy.  To find the space inside a shape, what do you measure?
(perimeter) (height) (area)

3. To measure area, we use square units.  A square inch is a square whose four sides each equal one inch.  A square foot is a square whose four sides each equal one foot.  What is a square yard?  (side equals 1 yard) (side equals 2 yards)

4. Which of these figures is a square mile?
(A) (B) (C)
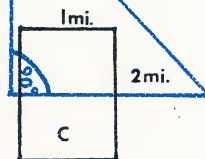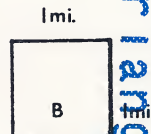


5. To find area we can put the shape on a checkerboard and count the number of square units inside it.  The top shape contains two square inches, so its area is two square inches. How many square inches are inside the bottom shape?  (1 sq. in.) (2 sq. in.)
(3 sq. in.)
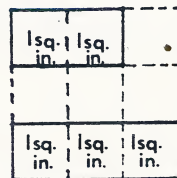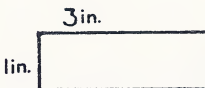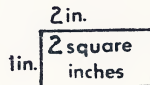


6. What is the area of this shape?
(4 square miles) (2 square miles)
(9 square miles)



MG
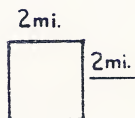
7. Area is always expressed in square units. What is the area of this shape? (3 inches) (3) (3 sq. in.)
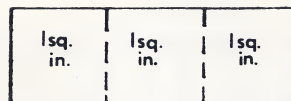
8. This square unit has been cut in half. How many square feet are in part X of this square? (1) (1/2)
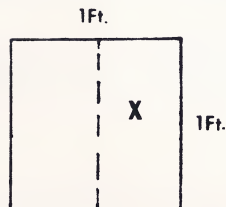
9. How many square inches are in the shaded part here? (1/2 square inch) (2 square inches) (1 square inch)
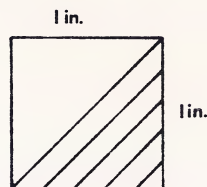
10. Now let's put a triangle on the checkerboard and see how many square units it contains. The top triangle contains half a square unit plus half a square unit plus one square unit or two square units of area. How many square units does the bottom triangle contain? (4 1/2 sq. units) (4 sq. units)
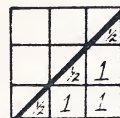
11. The side a triangle sits on is called the base. It is labeled on these three triangles. Which is the length of the base of the bottom triangle? (8) (10)
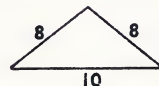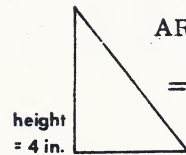
12. The height of a triangle is the straight-line distance from the top angle to the base. It is labeled on each of the triangles at the top. Which is the height of the bottom triangle? (3) (8) (11)
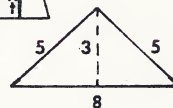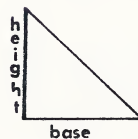
13.  We can use the height and base to calculate the area of a triangle.  Multiply one-half the base times the height.  Substitute the lengths from the triangle into this formula.  We get one-half times three inches times four inches.  Multiply one-half times twelve inches, or six square inches, area.

AREA = 1/2 BASE x HEIGHT

= 1/2 x 3 in. x 4 in.

= 1/2 x 12 in.

AREA = 6 square inches

height = 4 in.

base = 3 in.
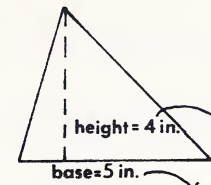
14  Find the area of this triangle the same way.  (12 sq. in.) (24 sq. in.)

height = 4 in.

base = 6 in.
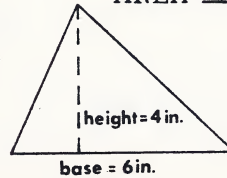
15.  One-half the base times the height can be expressed in a formula: area equals one half b, h.  Does b stand for base, and h for height?  (yes) (no)

16.  Now substitute the lengths of this base and height for the letters in the formula.  Area equals one-half times five inches times four inches.  Which answer is correct?  (20 sq. in.) (10 sq. in.)

height = 4 in.

base = 5 in.

AREA = 1/2b  h      1/2  5 in.  x 4 in.

17.  If you know that a triangle has a base of twelve feet and a height of three feet, what can you find?  (perimeter) (area)

height 3 ft.

base  12
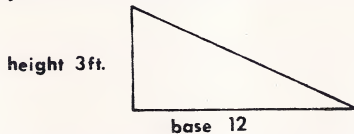
18.  Which formula would you use to solve the above problem?  (Area = 1/2b) (Area = 1/2bh)

19.  Which shows the correct substitution?  (1/2 x 12 x 3 = Area) (18 sq. ft. = Area)

20.  What is the area of the triangle in #7?  (36 sq. ft.) (18 sq. ft.)

21.  One half times b times h is the same as b times h divided by two.  Substitute the numbers into the formula to find the area of this triangle.  (7) (5) (10)
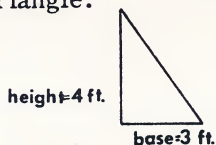
2

5
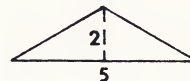
22. Which of these gives the area of this triangle?
( 6 x 8 over 2) (6 x 8) (6 x 10 over 2)
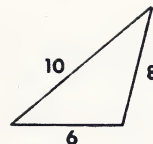
23. Which is correct for this triangle?
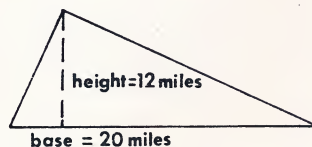(5 x 12 over 2) (5 x 13 over 2)
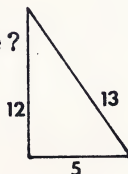
24. Find the area of this triangle.
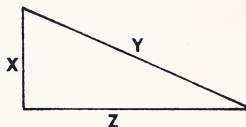(6 sq. feet) (7 sq. feet)

height=4 ft.

base=3 ft.

25. If the base of a triangle is five inches, and the height is two inches, what is the area?
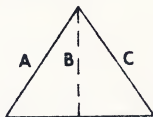(10 sq. in.) (5 sq. in.) (7 sq. in.)

26. Find the area of this triangle.
(120 sq. mi.) (120) (42 sq. mi.)

height=12 miles

base = 20 miles

27. Which is the base of this triangle?
(X) (Y) (Z)

X    Y    Z

28. Which is the height of this triangle?
(A) (B) (C)

A  B  C

29. Which of these is the height? (M) (N) (O)

M  N  O

30. Which is the height here? (D) (E) (F)

D  E  F
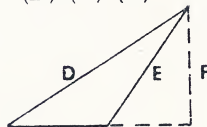
# Practice Folder

# MATHEMATICS Mg 6
## Geometry    series

1. To square a number means to multiply that number by itself. To square the number two, multiply two by itself. Two times two is four. Four is the square of two. To square three, multiply three times three, or nine. To square the number four, what do you do? (4 + 4) (4 x 4)

2. What do you get when you square six? (36) (12) (6)

3. What do you get when you square seven? (40) (49) (14)

4. What number do you get when you square 'side a' of this right triangle? (6) (16) (9)

b 4    c 5

a 3
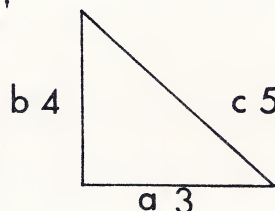
5. What is the square of 'side b'? (16) (8) (12)

6. What is 'side c' squared? (10) (25) (15)

7. The square of ten can be written like this: $10^2$; the "two" means that ten is multiplied by itself two times, and is read "ten squared". Ten times ten equals 100. What is the square of eight? $(8^2)$ (64) (both)

8. What is nine squared equal to? (18) (81)

9. What is eleven squared? (121) (11 x 11) (both)

10. What is the length of 'side b' squared equal to? (144) (24) (124)

b=12    C=13

a=5
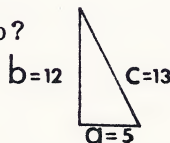
11. What is the length of 'side c' squared? (169) (13 x 13) (both)

Right Triangle
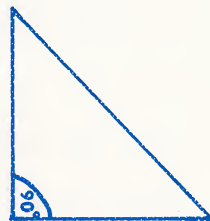
12.  To square a number do you add that number to itself, or multiply that number by itself? (add that number to itself) (multiply that number by itself)

13.  Finding the square root of a number is the reverse of squaring it.  To find the square root of 36, ask "What number times itself is 36?" Six times six is 36, so six is the square root of 36.

14.  To find the square root of 16, ask "What number times itself gives 16?" Four times four is 16.  Is four the square root or the square of 16? (square root) (square)

15.  Ask "What number times itself gives nine?" What is the square root? (4 1/2) (3)

16.  What is the square root of four? (2) (8) (16)

17.  What is the square root of 49? (98) (7) (8)

18.  This symbol means square root.  The number is written inside.  This means the square root of 25 is five, since five times five is 25.  What is the square root of 81? (9) (5)

$$\sqrt{\quad} \qquad \sqrt{25} = 5$$
$$(5 \times 5 = 25)$$

19.  Find the square root of 64.  (7) (8) (9)

20.  Which is the square root of 100? (10,000) (10)

21.  What is the square root of 169? (11) (12) (13)

22.  What is the square root of 144? (10) (12) (11)

23.  Now square the number five.  (25) (2 1/2) (10)

24.  What is the square root of 25? (625) (5) (50)

25.  What is twelve squared? (24) (144)

26.  What is the square root of 144? (12) (11) (10)

27.  What is the square of eleven? (169) (121) (144)

28.  What is the square root of 121? (12) (10) (11)

29.  Which answer is correct for the square root of 169? (14) (15) (13)

30. Which is correct for the square of 13? (142) (169) (199)

31. What does this mean: $A^2 = ?$    (A + A) (A divided by A) (A times A)

32. What is this symbol?                 (square) (divide) (square root)

$$\sqrt{\phantom{xx}}$$

1. There is a rule about right triangles called the Pythagorean Theorem. Based on this rule, if you know two sides of a right triangle, you can always find the other one. With which triangle can you use the Pythagorean Theorem? (A) (B) (C)
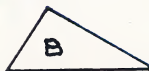
2. Which pair of choices correctly completes this statement about the Pythagorean Theorem? "Know _____ of a right triangle, can find the other _____." (1 side, two) (2 sides, one)

3. What is unknown in this triangle? (base) (hypotenuse)
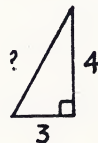
4. Let's label the sides of the right triangle A, B, and C. C is the hypotenuse. The formula for the Pythagorean Theorem is A squared plus B squared equals C squared. To find the length of the hypotenuse, first write the formula. Then substitute the numbers you know: three squared plus four squared equals C squared. Now solve; three squared is nine and four squared is 16.
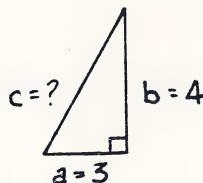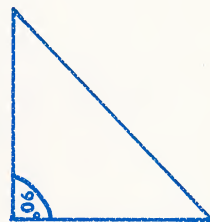
5. Next, add the two squared numbers together: nine plus 16 is 25. 25 is equal to C squared. Find what number times itself is 25. Five times five is 25, so C is equal to five. What is the length of the hypotenuse? (25) (5) (10)

6. To find the hypotenuse of this triangle, write the formula: A squared plus B squared equals C squared. Now substitute numbers: five squared plus 12 squared equals C squared. Five squared is 25 and 12 squared is 144. Now add. What is the sum? (169) (119)
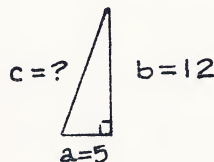
7. What number times itself equals 169? (15) (13)

8. Which is the length of the hypotenuse? (13) (26) (169)

MG

9. Follow the steps for this triangle. Write the formula, substitute numbers, and solve. Six squared is 36, and eight squared is 64. Now add. Find the square root of 100. What is the length of the hypotenuse? (20) (100) (10)

$a = 6$ $c = ?$ $b = 8$
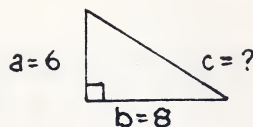
10. Square both sides of this triangle and add. Then find the square root. What is the hypotenuse? (5 miles) (56 miles) (5 inches)

$a = 3$ mi $b = 4$ mi $c = ?$
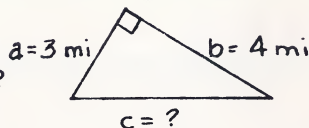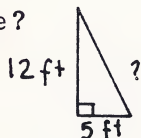
11. To find the length of the hypotenuse, square both sides and finish the problem. (12 inches) (15 inches) (20 inches)

? 12 in 9 in
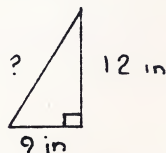
12. What is the length of 'side c'? (10 inches) (11 inches) (20 inches)

12 in Side c 16 in
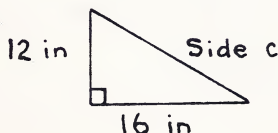
13. What is the hypotenuse of this triangle? (13 feet) (12 feet) (11 feet)

12 ft ? 5 ft

14. Which of these is the hypotenuse? (26 inches) (16 inches) (13 inches)

? 24 in 10 in
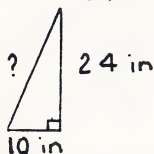
15. These are the steps to find the hypotenuse of a right triangle: 1. Write formula; 2. Substitute numbers; 3. Square both sides; 4. ?     5. Find square root. Do you add or subtract in Step 4? (add) (subtract)

16. Here is a triangle in which you know the hypotenuse and one side. To find 'side a', write the formula; A squared plus B squared equals C squared. Substitute the numbers you know: A squared plus four squared equals five squared. •Four squared is 16 and five squared is 25. To leave 'side a' by itself, move 16 to the opposite side. Do you add or subtract 16 from 25? (add) (subtract)

$b = 4$ $c = 5$ $a = ?$
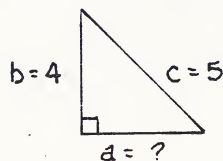
17. A squared equals nine. Find the square root of nine. What is 'side a'? (9) (3) (6)

$b = 4$   $c = 5$   $a = ?$
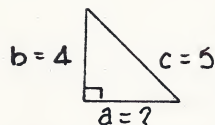
18. Are the steps for finding a side exactly the same as for finding the hypotenuse? (yes) (no)

19. To find the unknown side of this right triangle, write the formula, substitute, and square the numbers. Then subtract and find the square root. What is the length of the unknown side? (4) (16) (32)
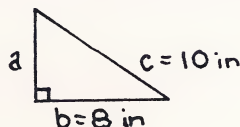
$a = 3$   $b = ?$   $c = 5$
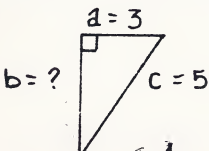
20. Find the unknown side in this right triangle. Follow the steps and square the numbers. Then subtract and find the square root. (25) (50) (5)

$c = 13$   $b = 12$   $a = ?$
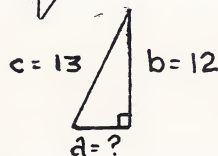
21. Square the numbers, subtract, and finish the problem. What is the length of 'side b'? (5) (100) (10)

$a = 24$   $b = ?$   $c = 26$
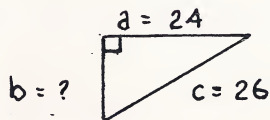
22. To find 'side a', square the numbers, subtract and finish the problem. (6 inches) (12 inches)

$a$   $c = 10$ in   $b = 8$ in

23. Find the unknown side of this triangle. (64 feet) (8 feet) (16 feet)

10 ft   ?   6 ft
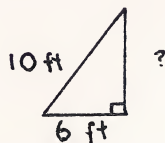
24. What is the unknown side of this triangle? (2 miles) (3 miles) (4 miles)

4 mi   5 mi   ?
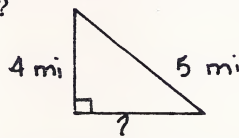
25. When you know the hypotenuse and want to find one of the sides, do you add or subtract in step four? (add) (subtract)

26. When you know the two sides and want to find the hypotenuse, do you subtract or add in step four? (subtract) (add)

27.  Do you add or subtract to find the hypotenuse in this problem?   (add) (subtract)

8 in   6 in   c = ?
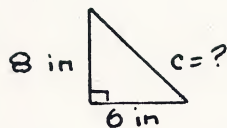
28.  What is the length of 'side c'?  (20 inches) (10 inches) (15 inches)

8 in   6 in   c = ?
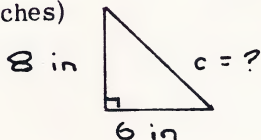
29.  What is unknown in this triangle? (hypotenuse) (side)

13   5   a
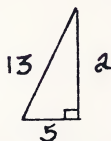
30.  Do you add or subtract to find 'side a'?  (add) (subtract)

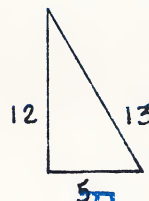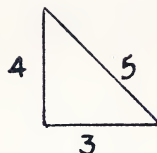31.  What is the length of 'side a'?  (10) (12) (24)

# Practice Folder

# MATHEMATICS Mg₈
## Geometry　series

1. There are only two right triangles whose sides are whole numbers: the 3-4-5 triangle, and the 5-12-13 triangle. Do these two types of triangles get their names from the size of their angles, or the length of their sides? (size of angles) (length of sides)

2. This is the 3-4-5 triangle. Are the sides of this triangle all whole numbers, or all decimal numbers? (whole numbers) (decimal numbers)
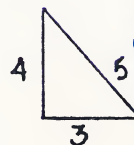
3. This is the 5-12-13 triangle. Are the sides all whole numbers or all decimal numbers? (whole numbers) (decimal numbers)
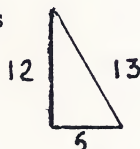
4. Which of these is a 3-4-5 triangle? (A) (B) (C)
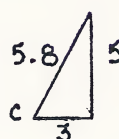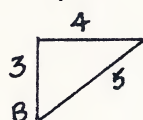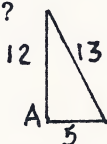
5. Which of these is a 5-12-13 triangle? (A) (B) (neither)
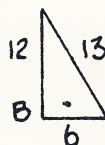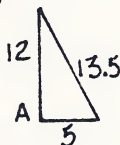
6. If you can recognize the 3-4-5 and 5-12-13 triangles, you can figure out an unknown side without using the Pythagorean Theorem. 'Side x' in the top 3-4-5 triangle is the side whose length is four. What is the length of 'side c' in the bottom triangle? (5) (4) (3)
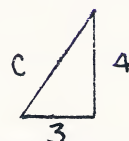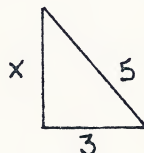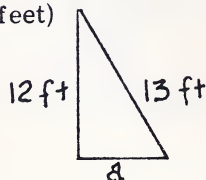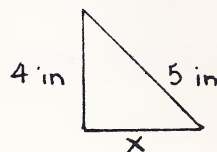
Right Triangle

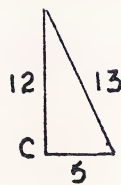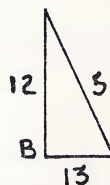7. What does 'side b' in this right triangle equal?
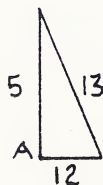(5 feet) (12 feet) (13 feet)
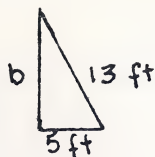
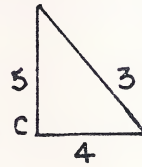8. What is the length of 'side a'? (5 feet)
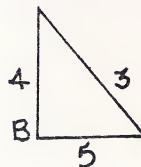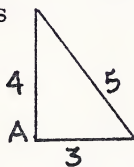(5) (13 feet)

9. What is the length of 'side x'? (6 inches)
(3 inches) (5 inches)

10. In the 5-12-13 right triangle, two of
the sides are much longer than the other
one. Which triangle has its sides correctly
marked? (A) (B) (C)

11. In the 3-4-5 triangle, the three sides
are close in length. Which triangle is
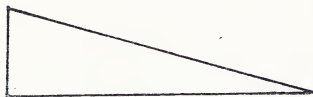correctly labeled? (A) (B) (C)

12. Which type of triangle is this?
(3-4-5) (5-12-13)

13. Which type is this? (3-4-5)
(5-12-13)

14. Which one is this? (3-4-5) (5-12-13)

15.  If we multiply each side of a 3-4-5 triangle by two, we get a 6-8-10 triangle, which is twice as large.  Did we multiply each side by the same number or a different number? (same number) (different number)

16.  What were the sides of a 3-4-5 triangle multiplied by to get a 15-20-25 triangle? (3) (5) (6)

17.  You can change a 5-12-13 triangle the same way.  What were the sides multiplied by to get the 15-36-39 triangle?  (4) (5) (3)

18.  If the sides of a 3-4-5 triangle are multiplied by a number, you can still find an unknown side without using the Pythagorean Theorem.  This is a 3-4-5 triangle with its sides multiplied by three.  'Side z' is the length, five times three, or fifteen.
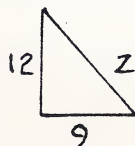
19.  This is a 5-12-13 triangle with its sides multiplied by three.  'Side r' is the length, 12 times three, or 36.
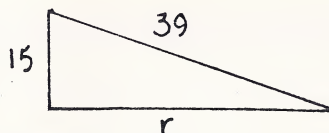
20.  Decide what kind of triangle this is, what number its sides are multiplied by, and what the length of 'side c' is.  (3-4-5, 5, 25) (triangle, sides multiplied by 'side c') (5-12-13, 2, 26)
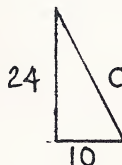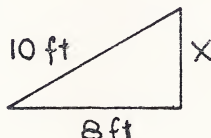
21.  Decide what kind of triangle this is, what number its sides are multiplied by, and what the length of 'side a' is.  (3-4-5, 4, 12) (triangle, sides multiplied by side a) (5-12-13, 2, 10)
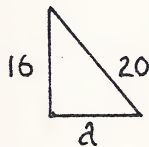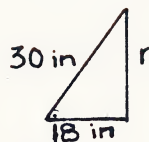
22.  Do the same for this triangle. (5-12-13, 4, 52 in.) (triangle, sides multiplied by side z) (5-12-13, 2, 52 in.)
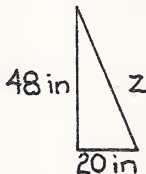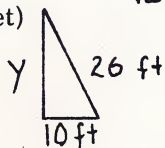
23.  Which choices are correct here? (3-4-5, 2, 9 ft.) (triangle, sides multiplied by side x) (3-4-5, 2, 6 ft.)
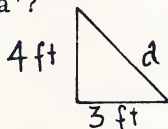
24. What is the length of 'side r' in this right triangle? (20 inches) (24 inches) (26 inches)
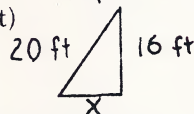
30 in / r

18 in

25. What is the length of 'side y'? (13 feet) (24 feet) (10 feet)
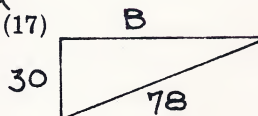
y | 26 ft

10 ft

26. Which of these is the length of 'side a'? (10 feet) (4 feet) (5 feet)

4 ft   a

3 ft

27. What is the length of 'side x'? (10 feet) (12 feet) (15 feet)

20 ft / 16 ft

x

28. Which of these is the length of 'side b'? (72) (17)

B

30   78

1. In lesson **seven** you learned to use the Pythagorean Theorem with right triangles. And in lesson **eight** **you** learned that the only right triangles whose sides are whole numbers are the 3-4-5 and 5-12-13 triangle.

2. You also learned to recognize these two types of triangles, and to find an unknown side without using the Pythagorean Theorem. What is the length of the hypotenuse of this right triangle? (12) (5) (13)
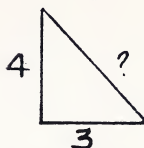
3. In this lesson we'll use the Pythagorean Theorem on right triangles whose sides are not all whole numbers. Which formula is the Pythagorean Theorem? $(A^2 + B^2 = C^2)$ $(A + B + C)$

4. The length of the two sides of this right triangle are nine and seven. Follow the same steps as in lesson eight; first, write the formula. A squared plus B squared equals C squared. Next substitute the numbers you know; nine squared plus seven squared equals C squared. Then solve; nine squared is 81 and seven squared is 49. What is the sum? (130) (120)
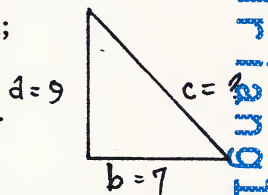
5. The next step is to find what number times itself is closest to 130. We know that 11 times 11 is 121, and 12 times 12 is 144. So the square root of 130 must be between 11 and 12. When we multiply, we find that 11 point four times 11 point four is 129 point nine six, very close to 130. 11 point four is the square root. Is it the length of the hypotenuse? (yes) (no)

6. We knew two sides of the triangle were nine and seven. We found the third side to be 11 point four. Substituting back into the formula, we find that nine squared plus seven squared is approximately equal to eleven point four squared. Because 130 is approximately equal to 129 point nine six. Are the sides of this triangle all whole numbers? (yes) (no)
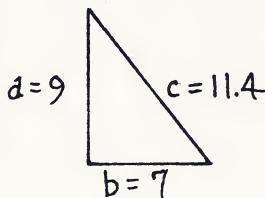
7. Can the Pythagorean Theorem be used with right triangles whose sides are whole numbers?
(yes) (no)

8. Can the Pythagorean Theorem be used with any right triangle if two sides are known?
(yes) (no)

9. Which is a fast way to find 'side c' of this triangle? (use the Pythagorean Theorem) (use the 3-4-5 right triangle rule)

$a = 4$  $c = ?$  $b = 3$
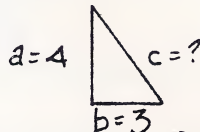
10. To find 'side a' of this triangle what must you use? (3-4-5 triangle) (Pythagorean Theorem)

3  6  $a$
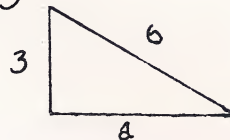
11. If a right triangle is not a 3-4-5 or 5-12-13 triangle, you must use the Pythagorean Theorem to find the unknown side. First, write the formula; A squared plus B squared equals C squared. Next, substitute; six squared plus seven squared equals C squared. Now solve; square the numbers and find the sum. (13) (85) (76)

$a = 6$  $c = ?$  $b = 7$
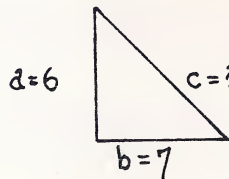
12. Is the square root of 85 a whole number? (yes) (no)

13. Between which two numbers is the square root of 85? (4-5) (6-7) (9-10)

14. Nine squared is 81 and ten squared is 100. Nine point two times nine point two is 84 point six four, close to 85. What is the length of the hypotenuse? (84.64) (9.2)

15. We knew sides A and B were six and seven, and we found side C to be nine point two. So if we substitute these lengths into the formula, we find that six squared and seven squared is 85. And nine point two squared is 84 point six four. They are approximately equal.

$a = 6$  $c = 9.2$  $b = 7$
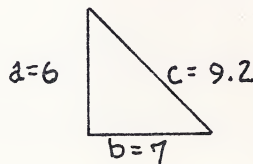
16. Now let's find the length of a side when we know a side and the hypotenuse. Write the formula: A squared plus B squared equals C squared. Next substitute: A squared plus ten squared equals 12 squared. Now solve; ten squared is 100 and 12 squared is 144. To leave "A squared" by itself, subtract 100. What is A squared equal to? (44) (244)

$a$  $c = 12$  $b = 10$
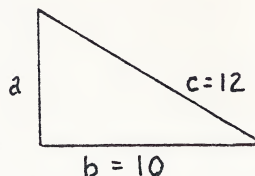
17.  Between which two numbers is the square root of 44?   (3-4) (6-7) (9-10)

18.  Six squared is 36 and seven squared is 49.  Multiply six point six by itself and six point two by itself.  Which answer is closest to 44?  (6.6 x 6.6) (6.2 x 6.2)   .

19.  What is the length of 'side a'?  (10) (12) (6.6)
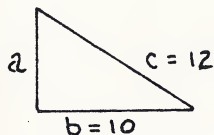


20.  To find the length of 'side b', write the formula, substitute, and square the numbers.  Then subtract. Which number is closest to the length of 'side b'? (5.7) (5.1)
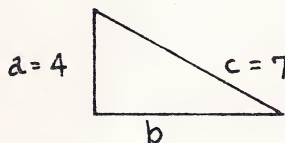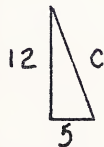


21.  Between which two numbers would the square root of 20 be found?  (2-3) (3-4) (4-5)

22.  Which is closest to the square root of 20?  (4.2) (4.5) (4.8)

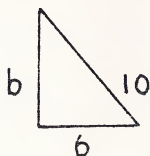23.  Between which two numbers would the square root of 55 be found?  (7-8) (8-9) (6-7)

24.  Which answer is closest to the square root of 55?  (7.1) (7.4) (7.8)

25.  To find 'side c' of this triangle, which could you use?  (5-12-13 triangle) (pythagorean theorem) (either)



26.  But which way is faster?  (5-12-13 triangle) (Pythagorean Theorem)

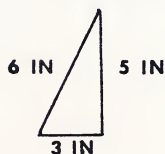27.  What is the length of 'side b'? (8) (4) (5)

1. What is the perimeter of a shape? (distance around it) (space inside it)

2. How do you find the perimeter of a triangle? (add sides) (base x height)

3. What is the perimeter of this triangle?
(11 inches) (14 inches) (9 inches)

**6 IN**   **5 IN**

**3 IN**

4. You find the perimeter of rectangles and squares the same way you do triangles, by adding all the sides together. Four feet plus one foot plus four feet plus one foot equals ten feet. Add the sides of the bottom rectangle together to find its perimeter.
(10 feet) (9 feet) (6 feet)

**4 FT**

**I FT**   **I FT**

**4 FT**

**3 FT**

**2 FT**   **2 FT**

**3 FT**
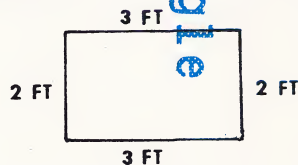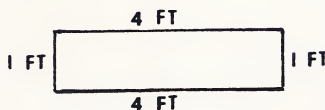
5. What is the perimeter of this square?
(9 miles) (6 miles) (12 miles)

**3 MI**

**3 MI**   **3 MI**

**3 MI**
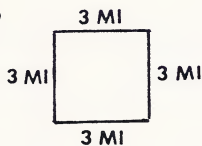
6. Find the perimeter of this rectangle.
(5 inches) (8 inches) (10 inches)
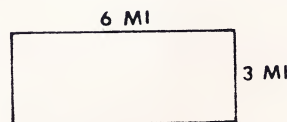
**4 IN**

**I IN**   **I IN**

**4 IN**

Right Triangle

90°

MG
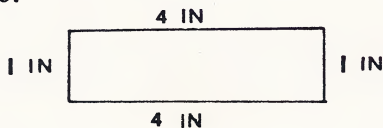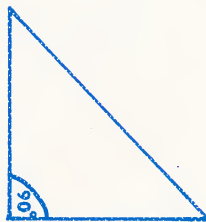
7. The longest side of a rectangle is called the length. In the rectangle at the top it is five feet. What is the length of the bottom rectangle? (4 inches) (2 inches) (8 inches)
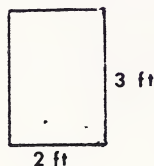
5 FT

2 FT

length

4 IN

1 IN
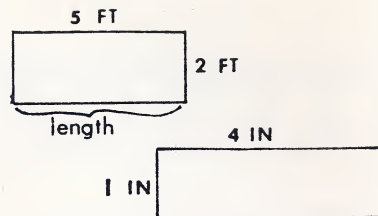
8. Which is the length of this rectangle? (6 miles) (3 miles) (9 miles)

6 MI

3 MI

9. The shortest side is called the width. It is one foot for the top rectangle. What is the width of the one at the bottom? (2 feet) (2 inches) (3 inches)

4 FT

1 FT

width

5 IN

2 IN
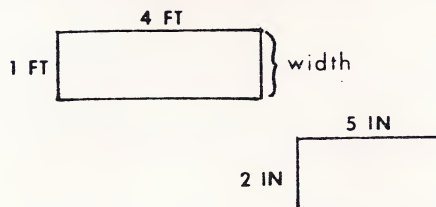
10. Which is the width of this rectangle? (2 feet) (3 feet) (5 feet)

3 ft

2 ft

11. Which is correct for this rectangle? (Length = 5 in.) (Width = 10 in.) (neither)

10 IN

5 IN
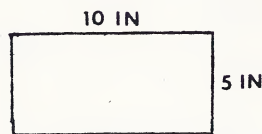
12. To find perimeter, did we add all the sides together, subtract the width from the length, or multiply the length by the width? (add sides) (subtract width from length) (multiply length times width)

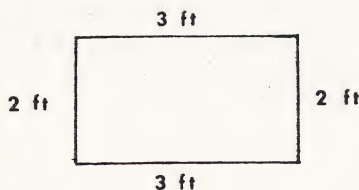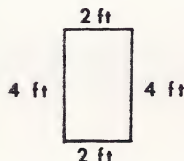13.  We can write a formula for the perimeter of a rectangle.  Length plus length plus width plus width equals perimeter.  This is the same as adding all the sides together.  Substitute the numbers from the rectangle into the formula: three feet plus three feet plus two feet plus two feet.  What does the perimeter equal? (6 feet) (10 feet) (7 feet)
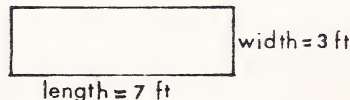
14. •Which is the correct substitution of numbers into the formula for this rectangle? (4 ft. + 4 ft. + 2 ft. + 2 ft.) (2 ft. + 2 ft. + 2 ft. + 2 ft.)
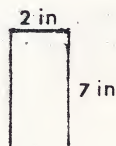
15.  The formula for the perimeter is sometimes written L plus L plus W plus W.  Does L stand for length and W for width? (yes) (no)

16.  Which of these gives the perimeter of a rectangle? (L + L + W + W) (Length + Length + Width + Width) (both)

17.  The formula can be further shortened to two times L plus two times W.  Two times L stands for L plus L and two times W stands for W plus W.  To find the perimeter of this rectangle, substitute the numbers into the right places: two times seven feet plus two times three feet.  Multiply, then add.  What is the perimeter? (10 feet) (20 feet) (21 feet)

18.  To find the perimeter of this rectangle, write down the formula, substitute the numbers, and solve.  What is the perimeter? (18 inches) (16 inches) (14 inches)

19.  To find the perimeter, write down the for-
mula, two times L plus two times W.  Which is
the correct substitution?  (2 x 20 ft. + 2 x 3 ft.)
(2 x 10 ft. ÷ 2 x 3 ft.)
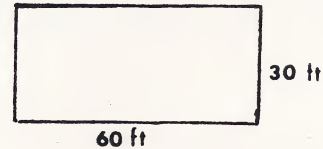
3 ft
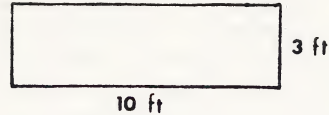
10 ft

20.  Find the perimeter.  (26 ft.) (30 ft.) (10 ft.)
(See illustration in number 19)

21.  Which of these is the correct formula for the perimeter
of this rectangle?  (1/2 b x h) (2 x L + 2 x W) (2 x L – 2W)

30 ft

60 ft

22.  Now substitute the numbers and finish the problem.
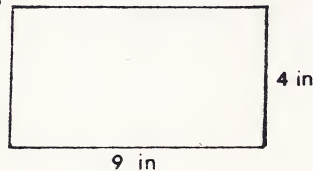(180 feet) (300 feet) (600 feet)
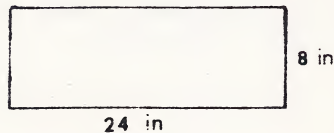(See illustration in number 21)

23.  What is the perimeter of this rectangle?  (56 feet)
(60 feet) (30 feet)

7 ft

21 ft
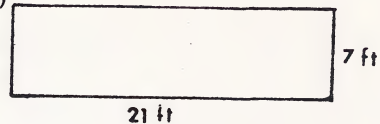
24.  What is the perimeter of this rectangle?
(13 inches) (26 inches) (30 inches)

4 in

9 in

25.  Find the perimeter of this rectangle.
(64 inches) (32 inches) (84 inches)

8 in

24 in

26. Since the four sides of a square are equal, we can write this formula for the perimeter: side plus side plus side plus side. We can further shorten it to: S plus s plus s plus s equals perimeter: 's' stands for side.
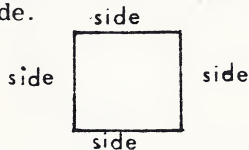
side

side ☐ side

side

27. Instead of adding the four sides, we can simply multiply one side by four. The new formula is four times s equals perimeter. Find the perimeter of this square. (12 inches) (8 inches) (16 inches)

side = 4 in

28. Write the formula, four times one side equals perimeter. What is the perimeter of this square? (3 ft.) (9 ft.) (12 ft.)

side=3 ft

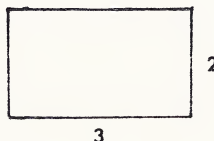29. Find the perimeter of this square. (20 inches) (10 inches) (30 inches)

5 in

30. How do you find the perimeter of a rectangle? (add sides) (2L + 2W) (either)

31. How do you find the perimeter of a square? (add sides) (4 x S) (either)

32. Which of these is a correct way to find the perimeter of this rectangle? (3 + 2) (2 x 3) (3 + 3 + 2 + 2)

2

3

33. Which of these is a correct way to find the perimeter of this square?  (5 x 5) (5 + 5 + 5 + 5) (2 x 5)

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┌─────────┐
│         │ 5
│         │
└─────────┘
    5
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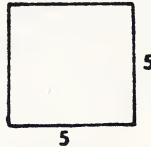
34. Which of these is the perimeter of a square wheat field whose sides equal one mile? (3 miles) (4 miles) (2 miles)

35. What is the perimeter of a city block that has a length of forty yards and a width of thirty yards?  (140 yards) (142 yards) (500 yards)

36. We are going to fence a yard that is thirty feet long and fifteen feet wide and allow for a gate. To know how much fence to get, we must find the perimeter and subtract three feet for the gate.  How much fencing should we buy?  (87 feet) (90 feet) (75 feet)

1. If the width of a rectangle is three feet and the distance around it is 16 feet, what don't you know? (perimeter) (length)

2. Which of these is the formula for the perimeter of a rectangle? (2L + 2W) (L x W)

3. If you are trying to find the length, where must you put the L? (on opposite side of equal sign) (by itself on one side of the equal sign)

4. If a number is added on one side of the equal sign, to move it do you add it to or subtract it from the values on the opposite side? (add it to) (subtract it from)

5. Complete this statement. "If a number is multiplied, to move it _____ the values on the opposite side." (multiply it by) (divide it into)

6. 2L + 2W = Perimeter. Which of these is the correct way to move "plus two W" to the opposite side of the equal sign? (1) 2L = Perimeter - 2W  (2) 2L = Perimeter + 2W
(1) (2)

7. 2L = Perimeter - 2W. Two L is the same as two times L. Which of these is the correct way to put the two on the opposite side?        (1) (2)

$$(1) \quad L = \frac{Perimeter - 2W}{2}$$

$$(2) \quad L = Perimeter - 2W - 2$$

8. To find the length of this rectangle, first write the formula; two times L plus two times W equals perimeter. Next, substitute the numbers you know; two times L plus two times three equals 16. Now multiply: two times L plus six equals 16. Which shows how to put the six on the opposite side of the equal sign? (2 x L = 16 + 6) (2 x L = 16 - 6)

width   3

Perimeter   16

9. Now divide by two. What is the length? (4) (5) (20)
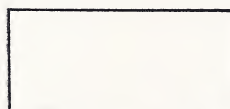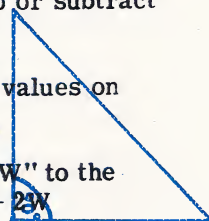
10. To find the length of this rectangle, write the formula, substitute the numbers, and multiply. Is the next step to add or subtract? (add) (subtract)
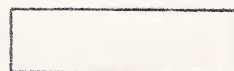
width   2

Perimeter   18

11. Now divide by two. What is the length? (20) (7) (14)

12. Follow these steps to solve this problem; write the formula, substitute numbers and multiply. Then subtract and divide by two. Which answer is correct? (3) (5) (6)

width   1

Perimeter   8
length   ?

13. Find the length for this rectangle the same way. (20) (10) (12)

width   5

Perimeter   30

length   ?

14. What is this length? (6) (7) (8)

width   6

Perimeter   28

15. Do you add, subtract, or multiply in step four? (add) (subtract) (multiply)

1. Write formula
2. Substitute
3. Multiply
4.      ?

16. Do you multiply or divide by two in step five? (multiply) (divide)

1. Write formula
2. Substitute
3. Multiply
4. Subtract
5.   ?   by 2

17. To find the width of a rectangle, follow the same steps. First, write the formula. Second, substitute the numbers you know. Third, multiply; two times ten. Then subtract from the perimeter, and divide by two. Which is the width? (16 feet) (4 feet) (6 feet)
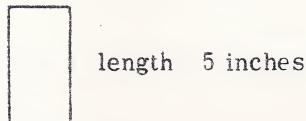
length   10
Perimeter   28

18. Are the steps the same for finding the width and the length? (yes) (no)
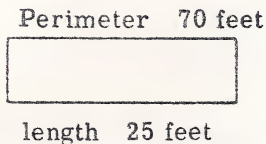
19. What is the width of this rectangle?
(2 feet) (4 feet) (6 feet)

Perimeter   20
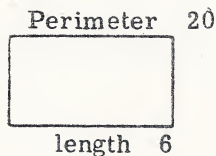
length   6

20. Find the width of this rectangle. (2 inches)
(3 inches) (1 inch)

Perimeter   12 inches

length   5 inches

21. What is the answer for this problem?
(5 feet) (10 feet) (20 feet)

Perimeter   70 feet

length   25 feet

22. Which of these is the formula for the perimeter of a square? (4 x Side) (2 x Side)
(3 x Side)

23. To find the length of each side of a square, write
the formula: four times Side equals perimeter.
Substitute the number you know; four times Side
equals 12. Then solve. To leave "side" by itself on
one side, divide by four. What is the length of each
side? (3 feet) (6 feet) (2 feet)

Perimeter   12
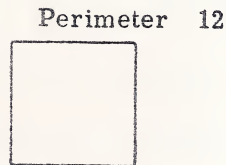
24. To find the length of each side of this square,
write the formula, substitute, and divide by four.
What is the length of each side? (12 feet) (9 feet)
(8 feet)

Perimeter   36 feet
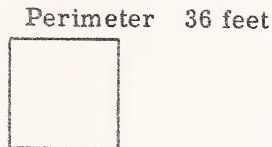
25. Which is the correct substitution of numbers
into the formula? (4 = 40 - side) (4 x side = 40)
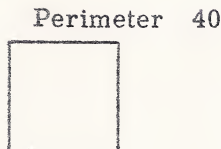
Perimeter   40

26. Leave "side" by itself on one side of the formula and finish the problem.

4 x | Side | 40

Perimeter    100 yards

27. Find the length of each side. (30 yards) (20 yards) (25 yards)

28. What is the length of a side? (8 miles) (6 miles) (12 miles)

Perimeter   24 miles

29. What is the length of each of the sides of a square that has a perimeter of 16 feet? (8 feet) (4 feet) (2 feet)

30. If the perimeter of a square is 32 feet, find the length of each side. (6 feet) (16 feet) (8 feet)

31. What is the length of each side of a square whose perimeter is 20 miles? (5 miles) (10 miles) (15 miles)

32. Do you use the same formula to find the side of a rectangle and a square? (yes) (no)

33. Which is the formula for the perimeter of a rectangle? (4 x S) (2L + 2W) (L x W)

34. Which is the formula for the perimeter of a square? (4 x S) (2L + 2W)

# MATHEMATICS Mg 12
## Geometry series

1.  You know that the area of a shape is the amount of space inside it.  You also know that area is measured in square units.  A square inch is a square whose sides are one inch, and a square foot is a square whose sides are one foot.  What is a square yard?  (each side is 1 yard) (each side is 2 yards)

2.  Area is the number of square units inside a shape.  One way to find the area of a triangle is to put it on a checkerboard and count the number of square units inside it.  The area of the top triangle is half a square unit plus half a square unit plus one square unit, or two square units.  Now count the square units in the bottom triangle.  (4 1/2 sq. units) (4 sq. units)
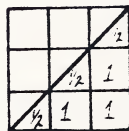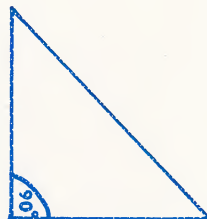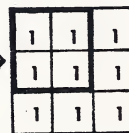
3.  What is the area of this square?  (4 in.) (4 sq. in.)

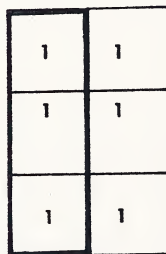4.  What is the area of this rectangle? (2 sq. in.) (3 sq. in.) (4 sq. in.)
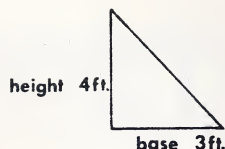
Right Triangle

90°

MG

5.  What is area?  (distance around) (square units inside)

6.  We learned that an easier way to find the area of triangles is to multiply one half times the base times the height.  For this triangle it is one half times three feet times four feet.  What is the area?  (20 sq. ft.) (12 sq. ft.) (6 sq. ft.)

7.  Now let's take a rectangle and divide it in half like this.  What is the half that has been shaded?  (a square) (a rectangle) (a triangle)

8.  When we divide a rectangle or square in half like this, we divide it into two equal triangles.  If the triangle labeled A has an area of twelve square inches, what is the area of triangle B?  (12 sq. in.) (8 sq. in.) (16 sq. in.)
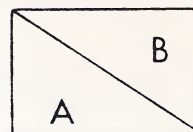
9.  The area of a rectangle or square is equal to the sum of the areas of the two triangles it contains.  The area of each of these triangles is one half times four times three, or six square inches.  So the area of the whole rectangle is the sum of the areas of the two equal triangles:  six square inches plus six square inches or twelve square inches.
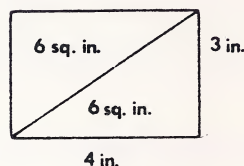
10.  The area of one triangle is eight square inches.  What is the area of the square?  (24 sq. in.) (8 sq. in.) (16 sq. in.)
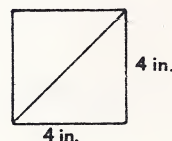
11.  To find the area of the rectangle we can add the areas of the two triangles.  The area of triangle **a** is one half times the base times the height, and the area of triangle **b** is one half times the base times the height.  Adding, we get the area of the rectangle is one times the base times the height, or base times height.  This is the formula for the area of the whole rectangle.
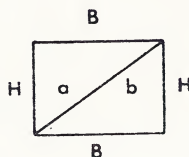
12. Use the formula, base times height, to find the area of this rectangle. (80 sq. in.) (40 sq. in.) (18 sq. in.)
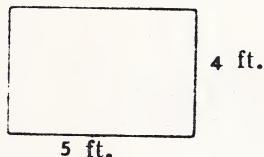
h 8 in.

b 10 in.
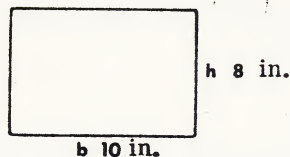
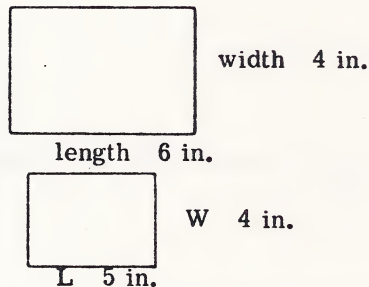13. What is the area of this square? (4 sq. in.) (26 sq. in.) (16 sq. in.)

4 in.

4 in.
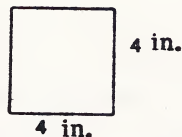
14. The length of a rectangle is its longest side. Which is the length here? (2 feet) (3 feet)
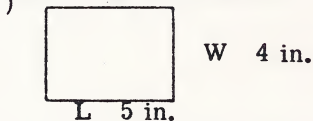
3 ft.

2 ft.

15. The width is the shortest side. Is it four feet or five feet? (4 feet) (5 feet)
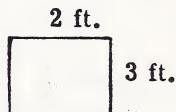
4 ft.

5 ft.

16. The length and width are the same as the base and height. So the formula for the area of a rectangle is length times width or L times W. Find the area of this rectangle. (24 sq. in.) (10 sq. in.)

width 4 in.

length 6 in.

17. What is the area of this rectangle? (20 sq. in.) (15 sq. in.) (21 sq. in.)
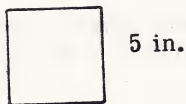
W 4 in.

L 5 in.

18. Find the area of this rectangle. (5 sq. ft.) (6 sq. ft.) (10 sq. ft.)
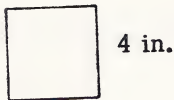
2 ft.

3 ft.

19. Since a square does not have a long side or a short side, we cannot write the formula "length times width". We simply write side times side or s times s. Substitute the numbers into this formula to find the area. (8 sq. ft.) (6 sq. ft.) (9 sq. ft.)

side 3 ft.
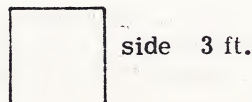
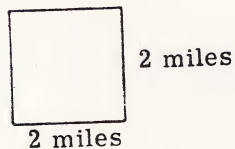20. What is the area of this square? (5 sq. in.) (10 sq. in.) (25 sq. in.)

5 in.

21. Find the area of this square. (12 sq. in.) (18 sq. in.) (16 sq. in.)

4 in.

22. Which formula is for finding the area of a square? (1/2 L x W) (S x S) (1/2 b h)

23. What is the area of a square plot of land whose side equals seven miles? (49 sq. mi.) (28 sq. mi.) (14 sq. mi.)

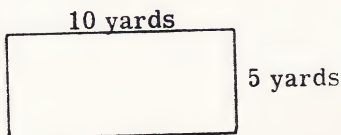24. What is the area of a pasture with these sides? (6 sq. mi.) (4 sq. mi.) (8 sq. mi.)

2 miles

2 miles

25. A farmer has a plot of land shaped like this. What is the area? (5 sq. mi.) (50 sq. mi.) (6 sq. mi.)

2 miles

3 miles
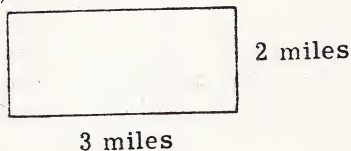
26. How many square yards are inside this rectangle? (25) (50) (30)

10 yards

5 yards

27. A forest ranger decided to plant one bush in every square yard of a plot. If we find the number of square yards in this plot, we will know the number of bushes the ranger planted. How many did he plant? (800 bushes) (600 bushes)

20 yards

40 yards
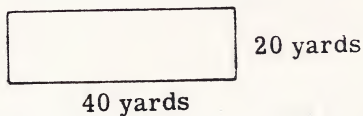
28. A farmer wanted to plant one tomato plant on every square foot of land in a plot that looked like this. How many tomato plants must the farmer buy? (60) (900) (100)

30 ft.
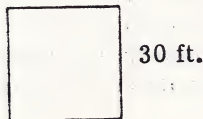
29. Which shape is this formula used with: "AREA = 1/2 x B x H? (square) (triangle) (rectangle)

30. This formula gives the area for which shape: Area = LxW? (square) (triangle) (rectangle)

31. Which shape is this formula used with? Area = SxS. (square) (triangle) (rectangle)

# Practice Folder

# MATHEMATICS Mg 13
## Geometry        series

1. In the last lesson you learned how to find the area of a rectangle. Which formula did you use? (L x W) (2L + 2W) (L + W)

2. Now suppose you know the area and the width. To find the length, first write the formula: L times W equals area. Then substitute the numbers you know: L times three inches equals 18 square inches. To leave L by itself on one side of the equal sign, do you multiply by the width or divide by the width, on the opposite side of the equal sign? (multiply by width) (divide by width)
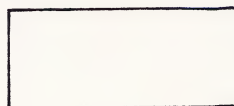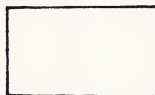
Width = 3 in.

Area = 18 sq. in.

3. What is the length of this rectangle? (6 inches) (5 inches)
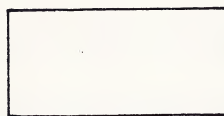
(See illustration above)

4. To find the length of this rectangle, write the formula, substitute the numbers you know, then leave L by itself by dividing by the width. What is the length? (12 feet) (3 feet) (4 feet)

Area = 6 sq. ft.
Width = 2 ft.

5. Which of these is the correct substitution of numbers into the formula for this problem? (L x 50 ft. = 5 sq. ft.) (L x 5 ft. = 50 sq. ft.)
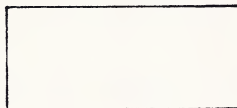
Area = 50 sq. ft.
Width = 5 ft.

6. Now finish the problem to find the length. (15 feet) (10 feet) (20 feet)

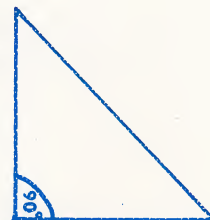7. Which of these is the correct formula for the area of this rectangle? (L x W) (L + W) (L divided by W)

Area = 21 sq. mi.
Width = 3 mi.

8. Find the length. (18 miles) (24 miles) (7 miles) (See illustration in problem 7)
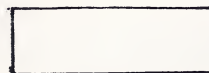
9.  Which of these is the length of this rectangle?
(49 yards) (8 yards) (21 yards)
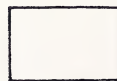
Area = 56 sq. yds.
Width = 7 yds.

10.  What is the correct length?  (21 inches)
(9 inches) (7 inches)

Area = 27 sq. in.

width = 3 in.

11.  To find the width of a rectangle, follow the
same steps.  Write the formula, and substitute
the numbers.  To leave W by itself, what do you
do?  (multiply by length) (divide by length)
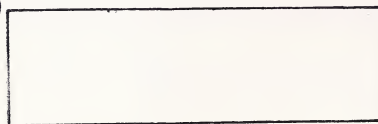
Area = 35 sq. in.
length = 7 in.
width = ?

12.  What is the width?  (5 inches) (5) (5 sq. in.)     (See illustration for problem 11)

13.  Which of these is the width for this rectangle?
(3 miles) (14 miles) (2 miles)
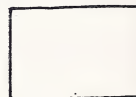
Area = 21 sq. mi.
length = 7 mi.

14.  Find this width.  (11 yards) (3 yards)
(22 yards)

Area = 33 sq. yds.
length = 11 yds.

15.  Which formula do you use to find the area of a square?  (L x W) (S x S)

16.  If you know the area and want to find the length
of a side, write the formula: S times S equals area.
Substitute the number for area and solve.  To find
S ask "What number times itself gives 16?"  Which
of these numbers gives 16 when multiplied by itself?
(4) (6) (8)

S x S = Area
S x S = 16 sq. in.

17.  What is the length of each side?
(8 inches) (16 inches) (4 inches)

S x S = Area
S x S = 16 sq. in.
4 x 4 = 16

18. To find each side of this square, write the formula and substitute the number for area. Then find what number times itself is 25 square inches. Then what is each side equal to? (5 inches) (50 inches) (12 inches)

Area = 25 sq. in.

19. Find the length of each side of this square. (1 mile) (2 miles)

Area = 4 sq. mi.

20. Which of these is the correct substitution into the formula for this problem? (49 sq. in. = Area) (S x S = 49 sq. in.)

Area = 49 sq. in.

21. To find S ask "What number times itself equals 49 square yards?" (12 yards) (7 yards) (24 yards)
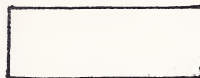
Area = 49 sq. yds.

22. What is the length of each side of a square that has an area of nine square feet? (3 feet) (4 feet) (2 feet)

23. If a square has an area of 36 square yards, what is the length of its sides? (13 yards) (6 yards) (7 yards)

24. If a square plot of land has an area of 64 square miles, what is the length of its sides? (8 sq. mi.) (32 miles) (8 miles)

25. What is the area of this rectangle? (24 sq. ft.) (27 sq. ft.)

3 ft.

9 ft.

26. Find the area of this square. (6 sq. in.) (36 sq. in.) (36 in.)
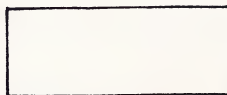
6 in.

27. What is this length?  (3 feet) (2 feet) (4 feet)

Area = 6 sq. ft.

width = 2 ft.

28. Find this width.  (2 inches) (2 yards) (2 miles)

Area = 10 sq. in.

length = 5 in.

29. What shape is this formula used with?  L x W = Area.  (rectangle) (square) (triangle)

30. What shape is this formula used with?  S x S = Area.  (rectangle) (square) (triangle)

# MATHEMATICS Mg₁₄
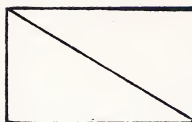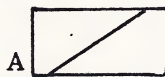## Geometry series

1. When a line is drawn through a rectangle like this, what is the rectangle divided into? (2 triangles) (2 squares)

2. Are the triangles equal or unequal? (equal) (unequal)

3. A line that cuts a rectangle into two equal triangles is called a diagonal. Which of these rectangles is cut by a diagonal? (A) (B) (C)

A  B  C

4. Do rectangles contain four 180-degree angles, or four 90-degree angles? (180 degree angles) (90 degree angles)

5. This rectangle is cut by the diagonal into two equal triangles. Does each triangle contain a 180-degree angle or a 90-degree angle? (180 degree) (90 degree)
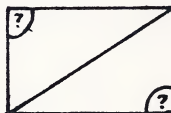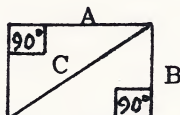
6. Which triangle contains a 90-degree angle? (right triangle) (scalene triangle)
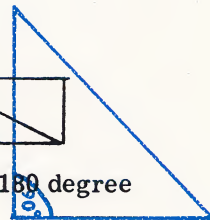
7. Does a diagonal divide a rectangle into two right triangles? (yes) (no)

8. What is the side opposite the right angle in a right triangle called? (base) (hypotenuse) (height)
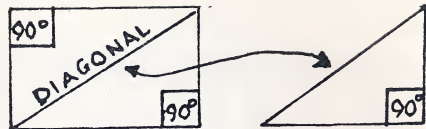
9. Which of these lines is the hypotenuse? (A) (B) (C)

A
90°
C
B
90°

Right Triangle

M.G

10. The diagonal forms two right triangles. Is the diagonal the hypotenuse or the base of these right triangles? (hypotenuse) (base)
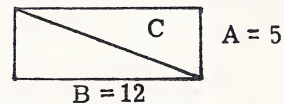
11. To find the length of a diagonal, C, follow the same steps you used to find the length of the hypotenuse of a right triangle. First write the formula: A squared plus B squared equals C squared. Then substitute the numbers you know: three squared plus four squared equals C squared. What is the name of this rule? (perimeter formula) (Pythagorean Theorem)

$C = ?$     $A = 3$

$B = 4$
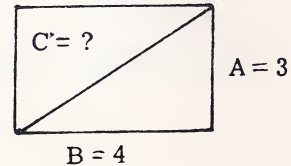
12. Now square both sides; three squared is nine and four squared is 16. Add the two squared numbers together; nine plus 16 is 25. Find the square root of 25. Five times five is 25. Then what is the length of the diagonal? (25) (5) (10)
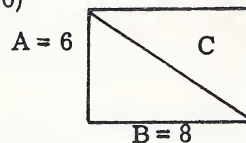
(See illustration in problem 11)

13. Find this diagonal the same way. Write the formula and substitute the numbers you know. Next, square the numbers; five squared is 25 and 12 squared is 144. Now add and find the square root. (26) (13) (169)

$C$     $A = 5$

$B = 12$

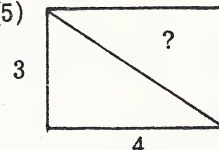14. What is the sum of the squared numbers for this rectangle? (100) (14) (28)

$B = 8$

$A = 6$     $C$
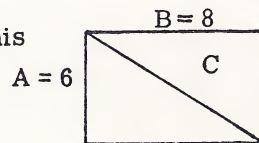
15. What is the length of the diagonal? (100) (10)

$A = 6$     $C$

$B = 8$

16. Follow the steps to find this diagonal. (25) (10) (5)

3

?

4

17.  When you know the two sides, A and B, and want to find the hypotenuse, C, do you add or subtract in step four?  (add) (subtract)

1. Write formula
2. Substitute numbers
3. Square
4. ?
5. Find square root

18.  Now if you know one side, A, and the hypotenuse, C, what do you do in step four to find Side B?  (add) (subtract)

1. Write formula
2. Substitute numbers
3. Square
4. ?
5. Find square root

19.  Let's find the missing side of this triangle. Write the formula and substitute; six squared plus B squared equals ten squared.  Next square the numbers and subtract.  What is B squared equal to?  (64) (16) (4)

$C = 10$  $A = 6$

B
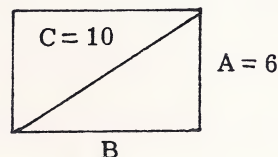
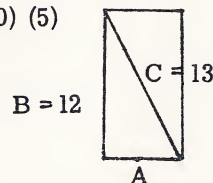20.  The last step is to find the square root.  Which is the side?  (8) (32)

21.  Follow the steps for this triangle.  What do you get when you subtract?  (2) (16) (4)

$C = 5$  $A = 3$

B
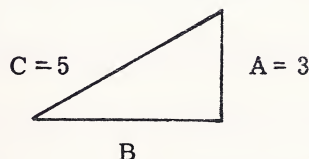
22.  Check these steps, then find the length of Side B. (8) (4)

$$A^2 + B^2 = C^2$$
$$3^2 + B^2 = 5^2$$
$$9 + B^2 = 25$$
$$B^2 = 25 - 9$$
$$B^2 = 16$$

23.  Follow the same steps to find Side A.  (25) (10) (5)

$B = 12$  $C = 13$

A

24.  To solve for Side A we wrote the formula and substituted, A squared plus 12 squared equals 13 squared.  12 squared is 144 and 13 squared is 169.  Subtract, and we find A squared is equal to 25.  So five is the square root and the length of Side A.  Is it a 5-12-13 right triangle?  (yes) (no)

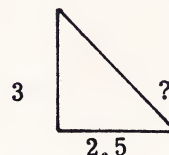25.  What is the length of this diagonal?  (7) (5) (6)

C  A = 3  B = 4
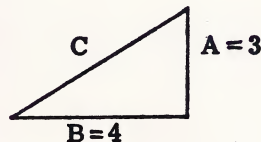
26.  Is it a 3-4-5 right triangle?  (yes) (no)

27.  What is the length of Side B?
(4) (8)

A = 6  C = 10  B
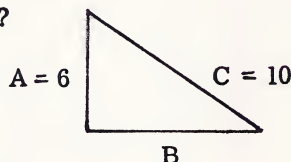
28.  So far the lengths have all been whole numbers. In this triangle one side is a decimal number.  Could you use the Pythagorean Theorem to find the third side?  (yes) (no)

3  ?  2.5

29.  Can you use the Pythagorean Theorem on an isosceles triangle?  (yes) (no)

30.  What size angles do rectangles contain?  (90 degree) (180 degree)

31.  What kind of triangles does the diagonal form?  (right) (scalene)

32.  Are they equal?  (yes) (no)

33.  Is the diagonal the base or the hypotenuse of the two triangles?  (base) (hypotenuse)

# MATHEMATICS Mg15
## Geometry series

1. Let's start with a dot and draw eight lines out from it. We'll make each line the same length. If we connect the ends of the lines with a curved line, we have a circle. Are all circles oval, round or square? (oval) (round) (square)
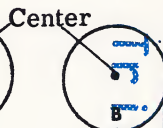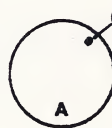
2. A circle is a curved line. Which of these figures is a circle? (A) (B) (C)
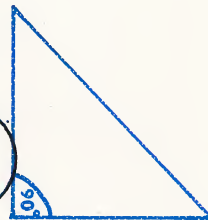
STOP

Right Triangle

3. Is a stop sign a circle? (yes) (no)

4. ·Every circle has a point called the center. The center can be pictured as a dot in the middle of the circle. Which circle has its center labeled correctly? (A) (B)
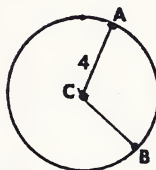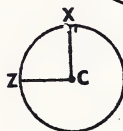
Center

A

B

90°

5. Every point on the circle is the same distance from the center. The dot labeled C is the center of the circle. The distance from the center to point A is four inches. What is the distance from the center to point B? (8 in.) (4 in.) (2 in.)

A

4

C

B

6. All straight lines drawn from the center to a point on the circle are the same length. Is distance CX equal to distance CZ? (yes) (no)

X

Z — C

7. Each of these straight lines, drawn from the center to the edge, is called a radius. Is each radius the same length? (yes) (no)
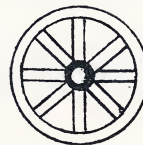
8. The plural of radius is radii. Lines A and B are two radii of this circle. If radius A is three feet long, how long is radius B?
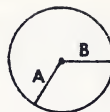
9. Does a circle have only two radii? (yes) (no)

10. The spokes of this wheel are all radii. If one spoke is 14 inches long, how long are the other spokes? (7 in.) (14 in.) (28 in.)

11. Complete this statement. "The spokes of the wagon wheel are radii because they _____." (are all the same length) (go from center to the edge) (both)

12. This pie has one piece removed. Each slice started at the center and went to the edge. Are the sides of the cut piece radii of the pie? (yes) (no)
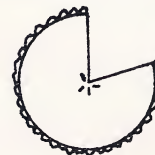
13. This is a stop sign with two lines drawn from the center to the edge. Are these lines radii? (yes) (no)

14. Why are these lines not radii? (they do not pass through the center) (they do not stop at the edge) (both)

15. If we draw a straight line that goes from one edge of the circle to the other, and passes through the center, how many radii does it contain? (two) (one) (none)

16. The line we drew is called a diameter. It is equal to two radii. Which choice correctly completes this sentence? "A diameter _____." (must pass through center) (is longer than a radius) (both)

17. Which of these circles has a diameter drawn in it? (A) (B) (C)

A    B    C

18. A diameter is a straight line. What other property does it have? (pass through the center) (go from one edge to another) (both)

19. Which circle shows the diameter and radius correctly labeled? (A) (B)
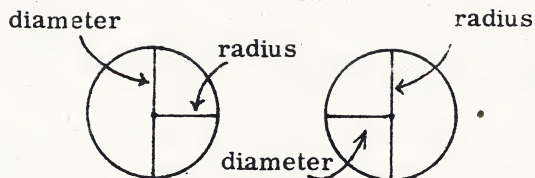
20. Does a circle have only one diameter? (yes) (no)

21. You can draw many diameters in a circle. Each must pass through the center, and each must go from one edge of the circle to the other. How many diameters are drawn in this circle? (6) (3)
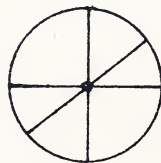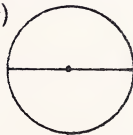
22. How many diameters are in this circle?
(3) (2) (1)

23. Every diameter of the same circle is the same length. Diameter A is 12 inches. What is the length of diameter B? (6 inches) (24 inches) (12 inches)
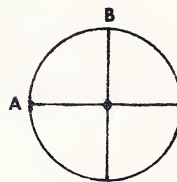
24. What is this straight line? (1 diameter) (1 radius) (both)

25. How many radii is it? (2) (1) (neither)

26. Choose the correct choice for this sentence. "A diameter is _____ as large as a radius." (twice) (half)

27. We can write this rule: a radius is equal to half of a diameter, or "R equals one half times D". If the diameter of a circle is 20 inches, to find the radius substitute 20 for D. R is equal to one half times 20. What is the radius equal to? (40) (10) (20)

Radius = half a Diameter

$$R = 1/2 \times D$$

28. A wagon wheel has a diameter of 28 inches.  Find the length of the radius.  (56 inches) (28 inches) (14 inches)

29. A diameter is twice the length of a radius. This can be written as 'D equals two times R'. If the radius of a circle is eight, to find the diameter substitute eight for R.  D is equal to two times eight.  What is the diameter equal to?  (4) (32) (16)

30. The radius of a circle is 24.  What is the diameter?  (24) (48) (12)
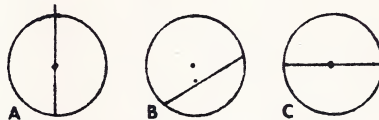
31. If the diameter of a pie is eight inches, what is the radius?  (4 in.) (8 in.) (16 in.)

32. Do the two rules, "R equals one half times D" and "D equals two times R", say the same thing?  (yes) (no)

33. Which of these circles has a radius drawn in? (A) (B) (C)
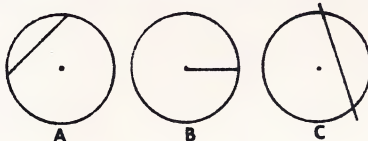
34. Which of these circles has a diameter drawn in? (A) (B) (C)

35. What is a diameter equal to?  (1 radius) (2 radii) (1/2 radius)
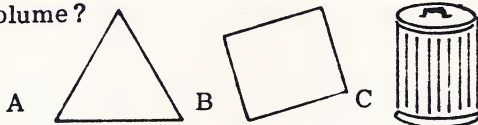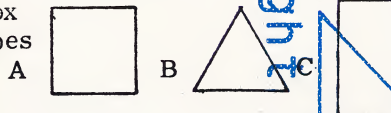
1. Shapes which have volume take up space, like cans and boxes. Flat shapes, like squares and circles, do not take up space, and therefore do not have volume.

2. Which of these shapes has volume?
(A) (B) (C)

A     B     C

3. One shape that has volume is a cube. A cube is a box whose sides are six equal squares. Which of these shapes could be used to make a cube? (A) (B) (C)        A    B    C

4. To make a cube, first lay down the square for the bottom. Next, put up the four sides. Then put on the top. How many sides does a cube have? (2) (6) (8)

5. Are all the sides equal? (yes) (no)

6. Volume is always measured in cubic units. A cubic inch is a cube that is one inch on every side. A cubic foot is a cube that is one foot on every side. Is a cubic yard a cube that is one yard or one foot on every side? (1 yard) (1 foot)
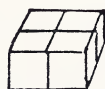
7. Which of these is a cubic unit?
(A) (B)

1 ft.
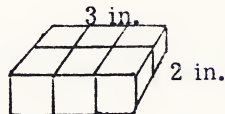1 ft.  1 ft.
1 ft.

1 ft.  1 ft.
1 ft.  1 ft.
1 ft.
1 ft.
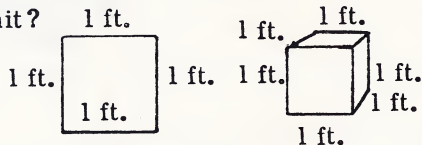
8. When you measure the volume of a shape, you want to find how many cubic units are inside it. We can put four cubic inches inside the box at the top, so the volume is four cubic inches. How many cubic inches are inside the bottom box?
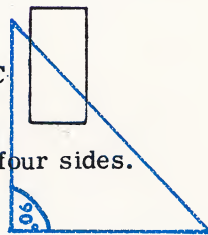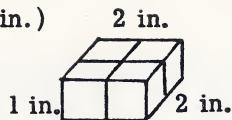(3) (8) (6)

4 cubic inches

3 in.
2 in.

Right Triangle 90°

MG

9. What is the volume of this box? (4 cu. in.) (2 cu. in.) (1 cu. in.)

2 in.

1 in.  2 in.

10. What is volume measured in? (square units) (cubic units)

11. Another way to find the volume of a box is to use the formula: Length times Width times Height. Write the formula and substitute numbers: four inches times two inches times eight inches. Now multiply. The volume is **64** cubic inches.

8 in.

2 in.

4 in.
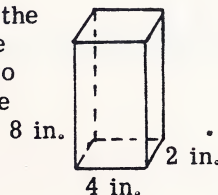
12. To find the volume of a box do you add or multiply the length, width and height? (add) (multiply)

13. Write the formula and find the volume of this box. (80 cu. in.) (180 cu. in.) (13 cu. in.)
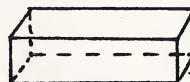
height = 4 in.

width = 4 in.

length = 5 in.

14. To find the number of cubic units inside a shape, do you find the area or the volume? (area) (volume)

15. What is the number of cubic feet inside this box? (200) (100) (300)

height = 4 ft.

width = 5 ft.

length = 10 ft.

16. What is the number of cubic feet inside the bin of this dump truck? (100) (150) (300)

width = 5 ft.

height = 5 ft.

length = 6 ft.

17. Does L stand for length, W for width, and H for height? (yes) (no)

18. What is the volume of this cube? (6 cu. ft.) (8 cu. ft.) (20 cu. ft.)
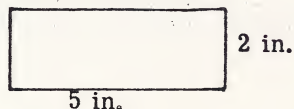
2 ft.

2 ft.  2 ft.

19. If a box has a length of ten inches, a width of five inches, and a height of two inches, what is its volume? (100 cu. in.) (150 cu. in.) (200 cu. in.)

20. If a box has these measurements, what is its volume? (40 cu. in.) (36 cu. in.) (50 cu. in.)
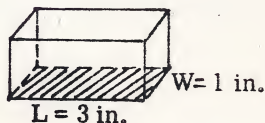
L = 3 in.
W = 2 in.
H = 6 in.

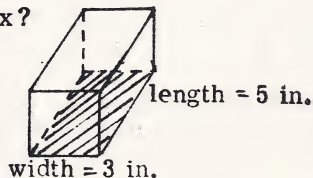21. Which of these is the formula for the area of a rectangle? (L x W) (2L + 2W) (4 x S)

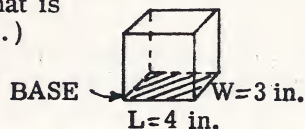22. What is the area of this rectangle? (7 sq. in.) (11 sq. in.) (10 sq. in.)

2 in.

5 in.

23. The shaded part of this box is a rectangle. What is its area? (4 sq. in.) (3 sq. in.)

W= 1 in.
L = 3 in.

24. What is the area of the shaded part of this box? (18 sq. in.) (20 sq. in.) (15 sq. in.)

length = 5 in.
width = 3 in.

25. The shaded part is called the base. What is the area of this base? (8 sq. in.) (12 sq. in.) (9 sq. in.)
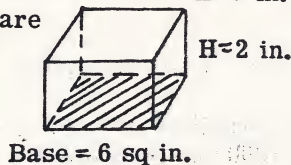
BASE
W=3 in.
L=4 in.

26. You can shorten the formula for the volume of a box from length times width times height to the Area of the Base times the Height. Is the Area of the Base the same as the length times the width? (yes) (no)

27. Calculate the volume of this box by first finding the Area of the Base and then multiplying by the Height. (36 cu. in.) (20 cu. in.) (30 cu. in.)

H =6 in
W= 2 in.
L=3 in.
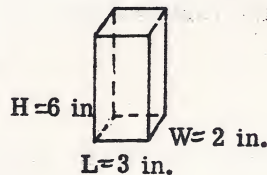
28. The Area of the Base of this box is six square inches. The height is two inches. What is its volume? (10 cu. in.) (12 cu. in.) (8 cu. in.)

H=2 in.

Base = 6 sq in.

29. Which of these formulas can you use to find the volume of a box? (Area of Base x Heigl (L x W x H) (either)

30.  Another shape that has volume is a can.  The top and bottom of a can look like this.  Which shape is it? (circle) (square) (oval)
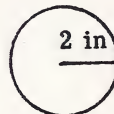
31.  What is the formula for the area of a circle?  $(\pi \times r^2)$ $(1/2\ b \times h)$ $(b \times h)$

32.  Pi is equal to three point one four.  What is the area of this circle? (18.84 sq. in.) (28.26 sq. in.)

3 in
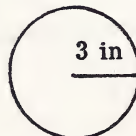
33.  What is the area of this circle? (6.28 sq. in.) (12.56 sq. in.)

2 in

34.  The volume of a can is also the Area of the Base times the Height.  Is "pi times R squared" the Area of the circular Base? (yes) (no)

35.  We can shorten this formula to:  pi times R squared times the height.  Do these two formulas mean the same thing? (yes) (no)
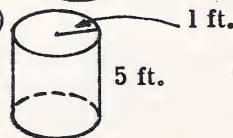
$$\text{VOLUME} = \pi \times r^2 \times H$$
$$\text{VOLUME} = \text{Area of Base} \times H$$

36.  Write the formula, pi times R squared times H, and find the volume of this can.  (50.24 cu. in.) (60.36 cu. in.)

Radius 2 in.

Height 4 in.
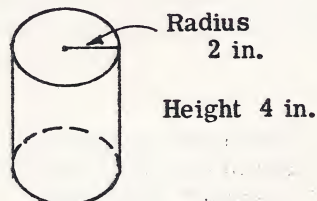
37.  What is the volume of this can? (17.50 cu. ft.) (15.70 cu. ft.)

1 ft.

5 ft.
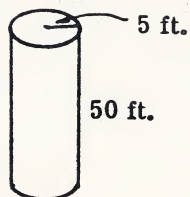
38.  This formula for volume is used with what shape:  Volume = L x W x H? (circle) (can) (box)

39.  This formula is used with which shape:  Volume = $\pi \times r^2 \times H$? (circle) (can) (box)

40.  A wheat bin has a length of ten feet, a width of nine feet, and a height of ten feet.  What is its volume? (800 cu. ft.) (1000 cu. ft.) (900 cu. ft.)

**41.** What is the number of cubic feet of wheat you can store in this silo? (1000) (3925) (500)

5 ft.

50 ft.

**42.** What is the volume of this box? (260 cu. ft.) (270 cu. ft.) (200 cu. ft.)

3 ft.

9 ft.

10 ft.

**43.** If a railroad car has a length of 12 feet, a width of five feet, and a height of five feet, what is the number of cubic feet of storage space in it? (300) (400) (350)